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ABSTRACT

This proceedings of the sixth annual Mid-South Instructional Technology Conference contains the following papers: "They're Not Just Big Kids: Motivating Adult Learners" (Karen Jarrett Thoms); "A Computer Integrated Biology Laboratory Experience" (James B. Kring); "Building Web Sites for Mathematics Courses: Some Answers to Notation Problems" (Annette C. Williams and Scott N. McDaniel); "Collaborative, Connected, and Experiential Learning: Reflections of an Online Learner" (D. Bruce Curry); "The Lions and the Hawks: Using Videoconferencing and Web Technology To Deliver a Cross-Campus New Product Innovation Course" (John Lord and Others); "Facilitating Asynchronous Distance Learning" (Gustavo E. Prestera and Leslie A. Moller); "Promoting Durable Knowledge Construction through Online Discussion" (Dave S. Knowlton); "Building Community in an Online Learning Environment: Communication, Cooperation and Collaboration" (Melanie Misanchuk and Tiffany Anderson); "Ebooks in the Academic Library" (Jackie Dowdy and Others); "Combining Studio Videoconferencing and the Internet To Promote Intercultural Understanding" (Ted C. Jones and Karen Sorenson); "Are Your Students Ready for College? Technology Literacy at Georgetown College" (William S. Rafaill and Andrea C. Peach); "Developing Library Instruction for Distance Learning" (Mary Hricko); "Help! Third Graders Know More (about Technology) Than My Graduate Students! Closing the Digital Divide" (Bruce Lewis); "Instructional Strategies for Achieving a Positive Impression in Computer-Mediated Communication (CMC) Distance Education Courses" (Yuliang Liu and Dean W. Ginther); "Interactive Learning through Creation and Use of a Cyber Corporation with Application in Public Relations, Business, and Finance" (Jeff Hoyer); "Introducing Novice Computer Users to Lesson Plan Development through WebQuests" (Bruce Lewis); "A Journey in Virtual Collaboration: Facilitating Computer-Mediated Communication among Pre-Service Teachers" (Tiffany Anderson and Others); "Developing Program Relationships with Rural Public Schools for Electronic Course Delivery" (David R. Cargill); "Electronic Portfolio Design" (Janet Buzzard and Peter Kaunitz); "Revisiting the Impact of Technology on Teaching and Learning at Middle Tennessee State University: A Revisited: A Comparative Study" (Lucinda Lea and Others); "Computer Animations as a New Tool for Teaching the Evolution of Musical Form" (Patricia Gray); "Web-Enhanced Teaching: Advantages of Integrating

Technology into the Large Lecture Course" (Linda Simpson and Lisa Dallas); "Promoting Transfer of Mathematics Skills through the Use of a Computer-Based Instructional Simulation Game and Advisement" (Richard Van Eck); "Instructional Technology Innovation in the Liberal Arts Classroom: A Conversation with the Maryville College Faculty Instructional Technology (FIT) Fellows" (Gina Roberts and Others); "Student and Faculty Issues in Distance Education" (David L. Fender); "Copyright: Fair Use or Foul Play (Karen Thoms and Susan Motin); and "Electronic Portfolios for Faculty Development" (Marilyn Heath and Steve Cockerham). (MES)

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Teaching and Learning

Today's Successes/Tomorrow's Horizons

April 8 - 10, 2001

Sixth Annual

Mid-South Instructional Technology Conference

2001 Proceedings

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They're Not Just Big Kids: Motivating Adult Learners

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With today's changing student population to include nontraditional, adult learners in nearly every higher education institution and program, it is necessary for faculty as well as administrators to recognize the learning and learning strategies which are appropriate for adult learners. Faculty can help students become more motivated, especially when they understand characterisitics of adult learners, motivation and its role in the workpace, strategies and activities for promoting motivation in adult learners, and key players in adult learning. This presentation addresses each of these areas.

Student populations are changing. We see adult learners in nearly every higher education institution andprogram. It is important that faculty recognize teaching and learning strategies appropriate to adult learners. Why? Because each year approximately 40 million adult Americans participate in educational activities (Wlodkowski, 1993, p. ix). This presentation will discuss the adult learner, andragogy, principles of adult education, characteristics of adult learners, strategies to help motivate adult learners, and characteristics and skills of a motivating instructor.

Adult Learners

Just what is an adult learner? Malcolm Knowles spent many years and a great deal of energy answering this question. According to Wlodkowski, Knowles identified adults by two criteria: an individual who performs roles associated by our culture with adults (worker, spouse, parent, soldier, responsible citizen) and an individual who perceives himself or herself to be responsible for his/her own life (1993, p. 5).

Andragogy and pedagogy refer to the study of teaching, "andra" meaning "man, adult," while "peda" meaning "child." Although pedagogy originated with early monks who recorded common characteristics among children who were learning basic facts, it was not until the middle of the 20th century that instructors realized their assumptions about how children learn did not apply to the adults they were teaching. Andragogy, the term first used in 1833 by a teacher in Germany, was reintroduced by a German social scientist in the 1920s, next adapted by adult educators in Europe in 1957, and finally brought to the United States (O'Connor, Bronner, and Delaney, 2002, p. 129). Knowles first used the term "andragogy" in America in the 1960s to reflect how adults learn. Andragogy recognizes the maturity of the learner, as discussed in Laird (1985, pp. 125-26) and:

- is problem-centered rather than content-centered.
- permits and encourages active participation.
- encourages past experiences.
- is collaborative between instructor-student and student-student.
- is based on planning between the teacher and the learner.
- is based on an evaluation agreement.
- prompts redesign and new learning activities based on evaluation.
- incorporates experiential activities.

The comparison of androgogy and pedagogy has shown us that early activities needto allow maximum participation by learners so they can invest their experience and values in the the learning process (Laird, p. 125). Laird also points out that andragogic instructors use more questions simply because adult learns **do** know a great deal. Laird (p. 126) points out that the primary function of the instructor of adults is to manage, or guide, andragogic processes, not to manage the content, which is the traditional approach in pedagogy.

Student-centered learning, also known as learner-centered education, has been and is still very strong in the American education system (Jarvis, Holford, and Griffin). What does this mean to educators? When examining adult education/learning, we must look at student demographics and predictions, principles of adult learning, characteristics of the adult learner, strategies used when teaching adults, and strategies to motivate adult learners. It means that early activities in the training/education experience allow for maximum participation by the learners, thus supporting active learning strategies. Laird (p. 126) writes of the need for the adult learner to be actively involved in establishing the learning objectives; as an instructor, however, beware of the temptation to let the students "call the shots" where the outcome might be a digression from the original (and curriculum-committee approved) intent and goals of the course or training.

Andragogic sessions vary significantly from pedagogic classes. While there continues to be an increase in the number and degrees of active learning activities taking place in K-12, the college and training arenas may far surpass the learners' understandings of what may and may not be negotiated as far as objectives, activities, etc. According to Laird (p. 126), andragogy raises interesting questions about the role of the instructor. As stated previously, in andragogy, the role of the instructor is to **manage** the processes, but **not** to manage the content. Two-way communication and feedback is critical. Instructors may serve as facilitators rather than lecturers. They may routinely switch between teaching strategies. For instructors, this change to the andragogic level of teaching may require a major adjustment to their teaching strategies.

O'Connor, Bronner, and Delaney summarize adult learning by stating (2002, pp. 127-28):

Individual adults learn differently, depending upon their experience, aptitude, and attitude. When you learn best in a classroom environment, by reading a book, or through Web-based training, depends on a number of elements. These include . . . your individual characteristics, the perceived value

of the learning task to you, and how much experience . . .
you have had with the topic in the past.

If the pedagogical/andragogical comparisons are made, the learning concepts and assumptions generated by these two points of view differ substantially. The conditions that are manipulated (process elements) differ in respect to **who** controls them, according to O'Connor et al.

Changing Student Demographics and Predictions

Loden and Rosener (1991) addressed how Workforce America would change during the 1990s. It was predicted that by the year 2000 we would see more women in the classroom, more international and minorities/persons of color in the classroom, more students holding full-time jobs, more one-parent households consisting of a student parent, and greater need for "services" such as child care. If we look around our classrooms in 2001, we are very likely to see that these predictions have become reality. And we are seeing a significant increase in the number of adult learners, regardless of gender or ethnicity.

Principles of Adult Learning

There are many principles associated with adult learning. A compilation of these principles is detailed below. Instructors of adult learners need to keep in mind that they should:

- present information in a manner that permits mastery. This means "bit-size chunks" of information rather than everything in one huge swoop.
- present new information if it is meaningful and practical. If the learner sees no connection between the job/course and the activities, that person will very likely lose interest and not succeed in the class.
- present only one idea or concept at a time. Show how one step progresses to the next.
- use feedback/frequent summarization. Make sure you (the instructor) lets the adult learner know what is being done correctly, and keep the summaries of completed activities alive and strong as reinforcement.
- practice learning as a self-activity. If they prefer to learn on their own, see if this is possible in the course without sacrificing in-class activities and their benefits.
- accept that people learn at different rates. Some people will have to be told two or three times how to do a task, others will have to be shown rather than told, and they may have to be shown only once or four or five times.
- recognize that learning is continuous/continual. We keep passing over plateaus and obstacles, but sometimes learners get bogged down or stopped. And then they start up again and begin the learning process again.
- believe that learning results from stimulation. We need to show students that this learning is beneficial to them, and we must set the stage for their success, including stimulating them to continue.

- enhance learning through positive reinforcement. Tell the adult learners, tell all learners in fact, what they are doing correctly. Build on the idea that we all like to succeed.
- follow the concept that people learn by doing. Keep them working, giving them hands-on experiences whenever possible, especially ones which parallel their work environment.
- desires the "whole-part-whole" learning strategy. Show examples of how this new skill or knowledge can be used, then move to the detail portions, and finally reinforce with another set of examples of the entire range of skills and knowledges and how they are used.
- supports the team environment to improve learning. Some people like to work in groups/teams, because that emulates the traditional workplace situation. However, trouble can brew if these learners, especially the adult learners, are expected to meet outside of class to work on group projects.
- knows that training/education must be properly timed. Introduce the training or education immediately preceding their need. Do not try to teach a person a new computer software application and then not have it available for 6-8 months back at their job.

Characteristics of Adults Learners

Adult learners may be easy to spot (often we are the ones with grey hair), and at other times it is more difficult to determine which of our students can be categorized as "adult learners." Some faculty consider college students to be adult learners because of the definitions identified above. Many college students are employed (often as full-time employees), have a spouse, may have one or more children, vote, serve on community committees, volunteer regularly, and are responsible for their own lives. We are seeing a higher percentage each year of our student population fitting into this category. Few of us consider our college students to be merely an extension of the K-12 group. In addition, those institutional staff and faculty working with training and faculty development need to keep in mind that their patrons or clients are adults and need to be treated as such when they take part in training activities.

Just what makes these adults so different from K-12 students, thus requiring trainers, instructional designers, and teachers to move from pedagogic to andragogic teaching/learning strategies when working with them? The following composite list is arranged in no particular order. They do, however, describe many of our adult learners. Thus, characteristics of adult learners include some of the following attributes:

- have first-hand experience.
- have set habits and strong tastes.
- have a great deal of pride, but their ways of "showing it" varies.
- have tangible things to lose so are very cautious in the educational environment.
- have preoccupations outside the learning environment.
- may be bewildered by options (sometimes).

- have developed group behavior consistent with their needs.
- have established a rational framework (values, attitudes, etc.)
- by which they make decisions.
- respond to reinforcement, especially positive reinforcement.
- have a strong feeling about the learning situation.
- in most cases can (and want to) change to better themselves.
- may have prejudices which are detrimental to the learning environment or to the institution.
- learn from reinforcement (thrive on it).
- have a strong need to apply what is learned — and apply it **now**!
- want to be competent in their application of knowledge and skill.
- want a choice in what they learn.
- like their "creature comforts" in room, furniture, equipment, HVAC, and refreshments.

Most adult learners bring a great deal of first-hand experience to the workplace; this can be a real asset during discussion times, or it can be a hindrance, and the effective instructor must know how to encourage as well as to curb "This is how we did it . . . ." discussions. Many adult learners also have set habits and strong tastes, which may be beneficial if the habit supports a strong work ethic or may be a hindrance during a required diversity training workshop.

O'Connor et al (pp. 131-32) carry the adult learning theories into the training arena. They define six implications for developing effective training programs, based on an understanding of adult learning.

Learning is not its own reward. Children and adults learn for different reasons. Adults are not impressed or motivated by gold stars and good report cards. Instead, they want a learning outcome which can be put to use immediately, in concrete, practical, and self-benefiting terms. Adult learners want practical, hands-on training sessions over general, theory-oriented classes. For example, the best way to motivate adults to learn a spreadsheet software package is to show them how they can use it in their own environment.

Adult learning is integrative. The adult learner brings a breadth of knowledge and a vast array of experiences to the learning situation. Adults learn best when they use what they already know and integrate new knowledges and skills into this bank of knowledge. In the event this new knowledge or skill is in direct opposition to what the learner already knows or believes, there is a possibility of conflict, which must be addressed immediately.

Value adjustment. Because training changes how work is processed, the adult learner must understand **why** the learning is useful and **why** these new skills must be mastered. Value adjustment means understanding why work that has been done a particular way in the past will not be performed in the same way in the future. Adult learners must be

convinced this change is for the betterment of the organization.

Control. Adult learners want control over their learning experiences. In K-12 learning, the teacher tells the students what to do, being very specific about assignments and expectations. Adult learning encourages collaboration with trainees about the pace and the content of the training curriculum. Adult learners in a college classroom can frequently be given more flexibility in determining their assignments, with the understanding that the basic criteria for the assignment must be met.

Practice must be meaningful. Repetition for the sake of repetition just does not "cut it" with adult learners, and it is unlikely that learning will take place. If repetition, however, does have meaningful results, then learning will take place. Adults frequently tend to be slower in some physical, psychomotor tasks than children. The adults are also less willing to make mistakes (someone might see them make this mistake), and they often compenstate by being more exact. In other words, they may take less "chances" with trial-and-error activities, thus making few mistakes. Send these adult learners home to their work station or with an assignment that will parallel what they have just learned. Because the adult learner does **not** want to make mistakes, especially on an assignment, might explain why adult learners tend to ask for clarification on assignments more often than traditional learners.

Self-pacing. Because adult learners acquire psychomotor skills more slowly than younger students, adults should be given the opportunity to proceed at their own pace, often in a self-paced learning package. Can self-paced activities always be integrated into the curriculum? No, and this is definitely a challenge to an instructor where there is a mix of adult and traditional learners.

Strategies to Help Motivate Adult Learners

Although what and how people learn is beyond guarantee or total prediction, we **can** make suggestions which might be effective strategies and guidelines to use with adult learners. The suggestions, attributed to no particular authors or sources but rather construed by the author of this article/presentation, include the following:

- put materials into "bite-size chunks" which people are able to understand.
- use the whole-part-whole concept, showing the overall picture followed by the details and then a refresher with the overall picture.
- make the material relevant, as close to the actual requirements of that person's job.
- explain **why** certain assignments are made and their relevance to the overall course or training sessions.
- provide plenty of documentation for the learner, usually in the form of hands-on experience and paper documentation.
- let the students work in groups, since they would rather ask other students for assistance rather than ask the course instructor.

- add a little "spice to their life" by giving them some degree of options and flexibility in their assignments.
- create a climate of "exploration" rather than one of "prove it."
- keep the course requirements in perspective to the amount of time for the course (credit hours, for example).
- make certain the student is equipped with enough knowledge and skill to complete the assignment, rather than setting the person up for failure.
- bend the rules, if necessary and appropriate, so that the adult learner can "push the envelope" and try new things.

By being flexible and willing to adapt to the needs of the adult learners, the instructor can be a motivating force in the classroom — rather than a hindrance and demotivator.

Characteristics/Skills of a Motivating Instructor

Most of us have had at least one motivating instructor who helped us want to learn the material which was presented. Stop and think about the qualities or characteristics of that motivating instructor. Could/do you possess some of those characteristics? Do you **want** to possess some of those same characteristics which motivated you as a learner? Although motivating instructors give us that special desire to learn and they have their own personal strengths and style, there are some common characteristics which can be learned, controlled, and planned for by anyone who instructs adults. Wlodkowski (p. 17) identifies these four cornerstones as expertise, emphathy, enthusiasm, and clarity. These skills can be learned and they can be improved upon through practice and effort. Charactertistics/skills of a motivating instructor can be classified by four categories:

- offers expertise, both in knowledge and preparation.
- has empathy, which includes understanding and consideration.
- shows enthusiasm, for the course, content, students, and profession of teaching.
- demonstrates clarity, whether it be in classroom teaching, explanation of assignments, or classroom discussion.

Offering Expertise. This is the power of knowledge and preparation, although it is also known as competence, substance, content, or experience. According to Wlodkowski (p. 17), the practical definition of expertise is three-fold: we know something beneficial to the student; we have a thorough grasp of the content, and we can and are prepared to convey this information through an instructional process. We must keep in mind that some of our adult students will have experiences, often first-hand experiences, which are relevant to the topic at hand and in greater detail than that of the instructor. Just our name and title will not impress them, but our actual experience might. Usually adult learners have a set agenda for being in a learning environment: they want this newly acquired skill or knowledge to help them solve a problem at work, build on already existing skills, learn new skills, advance in their jobs, upgrade to a new job, or get promoted. As the instructor of adults, it is imperative that we be able to offer them concrete examples involving the information or skill which they are learning. The knowledge or skill which we offer to teach these adult learners must be well mastered; we cannot walk into the classroom and "wing it" with this group of learners. In other words, we need the background as well as

the skill to "think on our feet" as we answer questions, and if we are teaching them a skill, we should be able to demonstrate it. In addition to our expertise with the content, we must also be able to convey this knowledge through an effective instructional process. Just because the instructor knows the content does not necessary mean that person is an effective teacher. Being well prepared is vital, but instructors must also be familiar and comfortable with the wide variety of instructional strategies they have at their disposal.

Having Empathy. The more the student needs and expectations are met, the more motivated they may be to learn. Thus, students need to investigate the course in which they are enrolling to determine that it is what is expected. Unfortunately, not all classes are optional, and students may have to enroll in courses which they do not want to take. Or, they may have to take a course from an instructor who is a second or third choice, one who has teaching strategies which are different from the students' learning preferences. According to Wlodkowski, empathy is the skill that allows instructors to meet the adult learner's needs and perceptions for motivating instruction (p. 24). What does this mean to us as instructors? It **may** mean we have to modify our teaching preferences to include instructional strategies which are more acceptable to the adult learner(s).

One of the more troublesome issues of adult learners has to do with what activities and how much time and other resources can they be expected to commmit. We as faculty may have an understanding of what the student needs to know and be able to do at the completion of the course, but does that student have that same understanding? Oftentimes they do not. The major obstacle for these adult learners is time—they just do not have the time to commit to endless hours of outside class activities and assignments. For that reason, faculty must be absolutely clear in their expectations (syllabus and assignments sheet) and require only work which demonstrates mastery or meeting of an objective. We all want our students (adult and otherwise) to succeed, so give students a reasonable amount of work, and make sure these assignments are within their grasp. Do not make the work so difficult that the learners face failure with every passing week in the class.

Empathy involves the human factor associated with learning; it is separate from the computers, the software programs, the attendance requirements, the late fees for late assignments, etc. Empathy does include flexibility, an understanding that babies **do** come early and miss the spring break by four days (thus the student misses a week of class), families experience the death of a friend or loved one, knowledge that a blizzard keeps a 70-mile commuter at home rather than face slipping into a ditch, or having compassion for a student who has just suffered a miscarriage. Some teachers will argue that these situations should not impact a student's educational path, but reality convinces us that they actually do. Naturally, our adult learners often have more complex situations with which to deal than do our more traditional learners.

Showing Enthusiasm. Have you ever noticed that when we talk about something for which we have a great deal of interest, we get more excited, more vocal, more demonstrative? Of course we have. This strong excitement or interest on behalf of a topic or cause is natural for most of us. Wlodkowski (p. 29) takes this definition further by saying enthusiasm is

> . . . the person's inner feelings as they are expressed in outward behavior. An enthusiastic instructor is a person who cares about and values his subject matter and teaches it in a manner that expresses those feelings with the intent to encourage similar feelings in the learner. Emotion, energy, and animation are outwardly visible in this person's instruction.

Demonstrating Clarity. Demonstrating clarity is really the power of language and organization. It can also be defined as "thinking on your feet" or articulating well. This final cornerstone is absolutely critical in teaching adult learners. Certain words such as "um" or "ah" spoken a couple of times in an answer to a question leaves serious doubts in the adult learner's mind regarding the competence of the instructor. The instructor would probably be wise to stop for just a minute, phrase the answer clearly mentally, and **then** answer the question or give a response.

Along with the formation of a response also follows the whole idea that a presentation must be well planned and well orchestrated. Our delivery of content must be thorough, fluid, and understandable.

Conclusion

This presentation/paper has included information which will help instructors be more effective when teaching adult learners. We have discussed the adult learner, andragogy, principles of adult education, characteristics of adult learners, strategies to help motivate adult learners, and characteristics and skills of a motivating instructor. By practicing some of these guidelines and by sharing this information with others on our campuses, higher education may be able to take a giant step forward as it strives to address the specific needs of the adult learners.

Suggested Resources and Useful Reading

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A COMPUTER INTEGRATED BIOLOGY LABORATORY EXPERIENCE

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ABSTRACT

There is a wealth of biology related material on the web. At Roane State Community College, we have placed computers on each student's biology lab table to be shared by two students. Each lab exercise includes web sites that enhance the laboratory experience. The CD-ROM that is included with their textbook is also available for use when it relates to their lab experience. Several other CD-ROMs are also incorporated as a part of the weekly lab exercise. This truly connects the biology laboratory experience to the latest technologies.

BACKGROUND

Roane State is a rural community college serving nine counties in East Tennessee. We started in 1971 with one main campus in Roane County located in Harriman, Tennessee. Now Roane State has two main campuses with the other campus located in the city of Oak Ridge. In addition to these two campuses, there are five other centers where we offer classes. Presently there are two biology labs on the Roane County and Oak Ridge campuses along with one lab in Cumberland County, and a lab soon to be placed at the Scott County facility. This will give Roane State a total of six fully equipped biology laboratories at four locations.

On the Roane county campus, we have begun to include computers as an integral part of each general biology laboratory exercise. In the past, we had a math-science computer lab down the hallway that was used as part of our lab and lecture classes. We reached the time that this computer lab needed to be extensively upgraded so we could offer web and CD-ROM capabilities at each terminal. With the onset of the student technology fee, it became possible to purchase computers to be placed in the biology lab where they would no longer be separate from the lab experience.

The present multimedia uses of technology in our lab consist of the following: A pair of TV monitors located near the ceiling are connected to a laser disk player, a color camera attached to the instructors microscope, and to the audio visual center. A second laser disk player is connected to a large presentation monitor on an elevated cart. An overhead

projector for transparencies placed in the center of the lab uses an 8'X 8' screen. We plan to continue using each of these along with computers. We have also received another presentation monitor which is connected to the instructor's computer. This monitor is used to show the students single images from a particular site.

DESIGN CONSIDERATIONS

It was felt that there was a good possibility we could use our existing general biology lab classroom without any major alterations. Each lab accommodates 24 students seated at six tables. The student tables are 42" X 60". Two students sit on each side facing the other side. There is a cabinet under the table located on both sides between each pair of students. These were used originally for the temporary storage of two microscopes each. When deciding how to best place the computer towers, it seemed like these cabinets were the logical location since the tabletops could not comfortably accommodate them. The computer monitors would need to be raised about six inches to place them at a more comfortable eye level. To accomplish this, we ordered tables 18' X 48" to be placed in the center of each lab table. The legs were cutoff for the appropriate height of about seven inches. One added benefit of having these tables was that there was a convenient out of the way place for the keyboard and mouse when not being used. Two monitors were placed toward the center of these tables facing opposite directions. This arrangement permitted the comfortable use of a computer by each pair of students. This also allowed ample table space for their lab manuals, microscopes, etc. Holes were drilled in the center of each lab table so the monitor, keyboard, and mouse cables were conveniently out of the way. The computers were connected to an expanded power source at each table. Connection to the Internet was brought down from the ceiling at three locations to serve each pair of student tables.

LAB SETUP PROCEDURES BEFORE CLASS

To avoid unnecessary problems during lab, the following steps are taken. The computers are turned on before the first lab of the week and turned off after the last lab. Our computers are set to automatically logoff after one hour when they are not being used. If CDs are to be used, they are placed in the drive before the students arrive. We use only one CD per class to avoid all of the problems dealing with multiple CDs. We do not use a server at this time. There is no reason for any student to touch the computer towers during lab. As a matter of fact, we would prefer for the student to forget about that part of the computer. The mouse and keyboard are all the students need to handle. We have one standard logon for all students and this is the only time they touch the keyboard. For each web site that is used during lab, we have entered the URL and saved it as a "Favorite" in the computer menu bar. This eliminates the arduous task of typing complex and lengthy codes. The mouse is used to navigate through each lab exercise.

THE LABORATORY SETTING DURING CLASS

To increase student interaction, we decided to let two students share a computer at their lab table, so it would be readily available as they were using their individual microscopes

or doing other lab exercises. It seems to work better when we supply the students with a handout sheet with detailed connections between the computer and their lab manual. Generally several questions are asked about the material being presented to ensure that the students are truly using the web. Since our biology lab accommodates 24 students, it simplifies our role as we float around the lab having to check only 12 monitors. When small problems arise, usually the students working together can solve their own problems. We are pleased to see the students spending more time in lab. Since many colleges and universities have their individual labs on-line, it is exciting to be able to show our students what other general biology students are experiencing during their labs. With the wealth of exceptional pictures of microscopic specimens, the students can compare what they are seeing through their microscope with a similar picture on their monitor. Many times the magnification for each specimen on their monitor is far greater that we are capable of getting with our light microscopes. When we find images captured with an electron microscope, it gives the students an added advantage not possible before.

COST INVOLVED IN SETTING UP THE LAB

The money to pay for the incorporation of computers into the biology lab came from the student technology access fee. Presently students pay $8.00 per credit hour or $62.50 maximum for eight or more credit hours per semester.

12 Dell computers for student use @ $1,250 each: $15,000.00
1 Dell computer for the instructor @ 1,250 each: $ 1,250.00
1 Printer: $330.00
6 tables for monitors @ $80 each: $480.00
24 sets of head phones @ $2,00 each: $48.00
Complete setup and wiring - no charge: $0.00
13 CDs Interactive Study Partner for Biology - no charge: $0.00
1 Presentation monitor connected to instructors computer: $0.00
Total: $17,100.00

We have purchased several sets of CD-ROM presentations in Lab Packs of 15 disks from Cyber Ed Inc. in Paradise, CA. These supplement areas in our lab where we have not found sufficient material in the format we desire and it gives variety to out lab exercises. These disks average about $50 each.

A SUMMARY OF STUDENT EVALUATIONS TOWARD THIS LAB EXPERIENCE

We sampled our students from two perspectives. First, we were interested in their computer background and if they have a computer at home connected to the Internet. Being a rural community college, we were pleased that 86% of our biology students had a computer at home connected to the Internet. Fifty percent of our students connect to the web more that six times per week. Thirty-eight percent use a computer at work. We also found out 50% have used a computer as part of another class such as: Comp I, Orientation, U. S. History, Western Civilization, Introductory Algebra, Spanish, Art, and

Engineering. Only 50 % of our students regularly use the computer labs on campus. It was encouraging that 85% of the students use E-mail regularly. We were disappointed to find only 7% access the Roane State Home Page regularly and only 25% used the CD included in their textbook. Out of 82 students that responded to our survey only two try to avoid the computer if at all possible.

Second, we were interested in their input about how computers were being used as part of their biology lab experience. We generally received a positive response for all questions. Practically all the students enjoyed having the computer as another tool for their use in lab. We received a negative response from 1 - 4 students on most of the questions on this part. We were very pleased that 79 students did not see a problem with two students sharing a computer. Seventy-eight students found the protozoan 3-D images to be beneficial, especially for volvox and spirogyra. Since all students keep copies of the lab exercises, we were pleased that about 50% accessed several of the web sites on their own after class. We used the prepared questions in the computer exercises whenever possible. The students checked their answers. The Biology Project from the University of Arizona supplies a tutorial for each question. Students are presented background information about the question asked which is very beneficial whether the question was answered correctly or not.

SETTING NEW GOALS

With the incorporation of computers into the laboratory experience, we can see an unlimited potential far into the future. We hope to develop a realization within our students as to the usefulness of computers in every aspect of biology. This is the beginning of our quest for an on-line lab component to our biology program.

Building Web Sites for Mathematics Courses: Some Answers to Notation Problems

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Abstract
Mathematics professors have struggled in the past with how to place documents containing mathematical symbols on their Web sites. This paper will address the use of both Mac and PC software for word processing, Web page authoring, and online course creation used by the presenters to produce mathematical documents and to publish them online.

Introduction
We have used our Web sites to enhance learning and instruction in our developmental studies mathematics courses. We have included syllabi, notes, and worksheets on these Web sites. Scott has incorporated notes, Microsoft PowerPoint presentations, interactive practice tests, and an interactive Microsoft Excel spread sheet for students to use to calculate their grades. Since the introduction of Blackboard CourseInfo software at Middle Tennessee State University last year, we have used this course management system for communication with students, to record grades, and to manage course information. Annette has begun using the CourseInfo site as her main Web site for her courses incorporating worksheets, and providing HyperStudio presentations and tutorials. Each of us (one PC user, one Mac user) has found ways to meet the challenges of publishing documents containing complex mathematical expressions online. So far, our courses have been Web-enhanced; however, Scott is now preparing to teach Elementary Algebra online.

Annette Williams, the Mac User
I am presently using a CourseInfo Web site to enhance my Elementary and Intermediate Algebra courses. This software enables an instructor to communicate with students through announcements easily posted on the Web site as well as through a ready-made

email distribution list. The software also allows HTML files to be published with little effort. I place worksheets, lecture notes, and HyperStudio files on the site for my students.

To prepare worksheets for publishing, I use Cooke Publications Mathwriter software to type the document. Unlike the usual word processing software, equations are typed along with the text within the MathWriter document without having to insert them as images. This is a quick way to create a worksheet. To create the HTML document, each page of the worksheet is individually selected and saved with the option "Save As A Picture" and pasted into an HTML document. Therefore, a three page worksheet would translate into one HTML document containing three GIF images. To place graphs into the Math Writer document, the graphing calculator on the Macintosh is used. Some drawings, such as triangles, are done with Microsoft Word or in HyperStudio and pasted into the MathWriter documents. HyperStudio has very easy to use drawing tools. When a page of the MathWriter file is copied as a picture and pasted into the HTML file, these graphs or drawings become part of that page's one GIF image. Saving each page as a separate image has made the documents print reliably for my students. The HTML document is created in Adobe PageMill. Each of these page images is a GIF file 8K to 16K in size.

The HTML file is loaded onto the CourseInfo site through the control panel by selecting "Add a Document" under the Assignments category. A browse option is offered to locate the file on the hard drive and when the submit button is pushed, it asked by file name for each GIF image giving a browse option to find each. This has been a very successful way to put mathematical materials into the students hands.

I also have many presentations created using HyperStudio software. These files have been made available on the CourseInfo site in two ways. The first way is to load them straight onto the site. Students are then prompted by the site to download the files. They can view the stacks by using HyperStudio Player, a free download from http://www.hyperstudio.com. The basic buttons used to navigate through the cards in the stack (the metaphor for this software) work, but some of the more advanced gimmicks do not.

The second way these files have been placed on the site is by copying and pasting each card in the stack separately into a PageMill document as the worksheets above were done. The advantage of this is that the students do not need to leave the site or have a viewer to see the notes. The drawbacks are that there is no navigation other than scrolling through the images, and of course, there are many GIF images for a large stack. Since the subject matter of these files is mathematics, the text is done in graphics mode rather than in a text box on the individual cards. It is easier to incorporate symbols that way. Some of the mathematical expressions were written with MathWriter then copied and pasted as a picture into the HyperStudio stacks. Text boxes would not copy as images from this application.

Examples of the worksheets and HyperStudio files can be viewed at http://www.mtsu.edu/courseinfo. See any of the my Intermediate Algebra sections and sign in as a guest.

Scott McDaniel, the PC user

The development of the Web site for both Elementary and Intermediate algebra has been an ongoing effort for the last 14 months. I began to take an interest in Web design in January 2000. Since then I have developed more than 400 pages for student use. These pages not only contain several detailed example problems but also interactive practice that gives students instant feedback Getting math symbols on the Web can be a somewhat tedious task. However, with an elementary understanding of some basic software, one may publish and manage a fully functional Web site—one that is either there to enhance the class, or even a class that is totally online.

I use Microsoft FrontPage to publish and manage his site. Most of the documents are written in Microsoft Word, PowerPoint, and Excel. The Equation Editor that comes preinstalled in Word was used in earlier Web pages. Recently, though I have upgraded to Design Science Math Type (Equation Editor is a junior version of Math Type). This allows one to change the color of the equations and gives one more flexibility when creating documents with several math symbols. Currently, there is no effective way of expressing standard mathematical notation in Web pages. Equations can be displayed as GIF images but printing is poor, pages can download slowly, and they don't adapt to the browser user's font choices. One way to help speed up the process (in FrontPage) is to download and HTML filter to clean up the files once they are exported to the Web. This filter may be found at http://officeupdate.microsoft.com/2000/downloadDetails/Msohtmf2.htm?s=/downloadCatalog/dldWord.asp.

The program Winplot is used to get graphs on the Web. It may be downloaded for free at http://math.exeter.edu/rparris/. It is by far the easiest—certainly the cheapest—way to get basic graphs to the Web. It is easy to shade, color, and change the thickness of lines. An example may be found at http://www.mtsu.edu/~smcdanie/085_Spring_2001b/Chapter9/9_3&9_4quizanswers/Chapter9_3&9_4quizanswers.htm. If one desires more detailed plots, more sophisticated—and more expensive—computer algebra systems may be used with relatively no problems. If one requires students to use a graphing calculator, then placing screen shots on the Web is a must. Screen shots from the TI-83, which our department requires students to buy, can easily be captured with the TI-83 graph link. An example may be found at http://www.mtsu.edu/~smcdanie/085_Spring_2001b/TI_83_Help/Ch7_2/section_7_2_Graphing_lines.htm.

Collaborative, Connected, and Experiential Learning: Reflections of an Online Learner

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Abstract:
Online learning is a relatively young field, which is still being defined as a discipline. As faculty members wrestle with decisions about how to structure online courses for collaborative, connected learning, student perspectives of successful courses can provide valuable insights for decision-making. The author, a second year student in Nova Southeastern University's (NSU) School of Computer and Information Sciences (SCIS) Doctoral Computing Technology in Education (DCTE) program, presents general research findings pertaining to collaboration in online learning courses along with personal insights into what makes a project-based online course successful as a collaborative learning experience.

Introduction

While online learning offers students many advantages over campus-based learning, problems do exist. One such problem is the attrition rate of online learners, brought about in large part by a sense of isolation (Adelskold, Aleklett, Axelsson, & Blomgren, 1999). One teaching/learning model, which can ameliorate this sense of isolation, is collaborative learning. Collaborative learning involves students in social interaction, as groups work together to solve problems. Students in distance education programs, though separated spatially, can gain a sense of togetherness as they share and clarify ideas, actively contribute to a team, and cooperatively solve problems (Cecez-Kecmanovic & Webb, 2000).

Until recent times, collaborative approaches to distance learning were limited by the cost and sophistication of the technology. However, with advances in computer technologies and telecommunications, it is now possible to offer collaborative learning experiences in a cost-effective manner. These advances coincide with a general shift in educational theory to a collaborative constructivist conception of learning, which recognizes the learner's need to share control and assume responsibility for constructing meaning in the context of a peer group (Anderson & Garrison, 1998).

However, few studies have been conducted that examine the impact of the collaborative teaching/learning model in the distance-education setting (Hardwick, 2000). As faculty members wrestle with decisions about how to structure online courses for collaborative learning, student perspectives of successful courses can provide valuable insights for decision-making. This paper presents general guidelines for collaborative learning in online courses, along with personal insights into what makes a project-based online course successful as a collaborative learning experience.

General Guidelines

Collaborative learning is an outgrowth of cooperative learning, in that students must develop cooperative learning skills in order to use them in self-directed, high-performing teams. These teams conduct free inquiry and members jointly solve problems. Success in cooperative learning is grounded in the skills students develop within the context of the structure provided by the instructor. In distance learning, students must possess or develop the technical skills necessary for online communication, as well as acquire and practice social behaviors necessary for collaboration (Kemery, 2000).

Effective Team Members

Instructors should provide guidance for students on how to work effectively in collaborative teams. The social aspects of successful teams should be explicitly taught and not assumed. In order for teams to succeed, certain member qualities must be present. Among those desirable qualities are an ability to clarify and commit to goals, an interest in other team members beyond the task at hand, a desire to confront conflict positively, an understanding of others' perspectives, a commitment to make decisions inclusively, the valuing of individual differences, a willingness to freely contribute ideas and encourage team members, an open and honest evaluation of team performance, and a readiness to celebrate accomplishments (Robbins & Finley, 1995).

Communication: The Key to Collaboration

The essence of project-based, online collaborative learning is communication because positive group formation and learning occur through on-going dialogue (Kemery, 2000). Asynchronous communications can be utilized for much of the collaborative effort, through email with attachments and private forums. Additionally, synchronous private chat rooms can be used advantageously to facilitate collaborative learning (Lai, 1999). Synchronous communications are critical for establishing team roles, responsibilities, goals, deadlines, and for resolving differences of opinion. Team chats are also important for building relationships, encouraging one another, maintaining momentum, and celebrating accomplishments.

Personal Reflections

This section presents personal reflections pertaining to my involvement in a rewarding collaborative experience in one of my first courses taken in NSU's DCTE program. As is true of all courses in the program, it began with a weeklong, on-campus meeting, in which students were introduced to instructors and to one another, and were familiarized with the course content and requirements. The remainder of the course (nearly five months) was conducted entirely online.

Many factors were responsible for the successful implementation of this collaborative online learning experience. While there are several categories of factors, which could be discussed, this paper directs attention to instructor factors and student factors. For the purposes of discussion, instructor factors are defined as those things that the instructor does to facilitate an environment conducive to collaboration. Student factors are defined as those things for which students are responsible if the learning process is to be productive and successful.

Instructor Factors

Challenging project
For collaboration to work, the team project must be challenging enough to demand teamwork. Members need to sense that they are dependent upon one another in order to be successful. If this criterion is met, members will be more likely to appreciate each other's unique contributions. Furthermore, challenging projects emulate real world situations and help prepare learners to be productive members of society.

George K. Fornshell, Ph.D, taught the particular course under consideration, Project in Courseware Design and Development. The course content focused on the design, development, implementation, and evaluation of technology-based, content-intensive courseware. Students worked in teams to master the principles of instructional design (analysis, design, development, implementation, and evaluation). Team members jointly developed an educational courseware product. This development process included planning the product, creating a working prototype of the content-rich courseware, alpha/beta testing the product, and reflecting on the learning experience.

Clearly stated project requirements
Clearly stated project requirements give team members a common starting point and provide a structure upon which to build. They also assist students with the planning of collaborative work responsibilities. The instructor provided the following outline for our courseware design and development project:

Assignment 1: Analysis and Design
Part 1: Product Review (individual submission)
Part 2: Instructional Design (team submission)
Assignment 2: Implementation (team submission)
Part 1: Written Materials--Summary description of product
Part 2: Electronic Product
Assignment 3: Evaluation and Reflections
Part 1: Evaluation (team submission)
Alpha test (evaluation forms and summary)
Beta test (evaluation forms and summary)
Part 2: Reflection (individual submission)
A personal communication from the student to the professor concerning the overall learning experience

Flexibility in meeting project requirements
Flexibility in meeting project requirements balances the provision of clearly stated requirements. Flexibility enables students to develop ownership of the project, provides room for creativity, aids in the development of critical thinking skills, and encourages a sense of team unity and individuality.

Each team was permitted to freely choose what its educational unit would be. The only requirement was that the product needed to be a complete unit of study with educational value. Our team chose to develop a photography unit because I was experienced in that area and could act as the Subject Matter Expert (SME) for the team. I also had an

extensive collection of photographs and a scanner for converting them to a digital format. Other team members were more experienced with the technical aspects of the project.

Subdividing the project

The instructor, by properly subdividing a project, can help teams manage a challenging task, encourage teams to keep on schedule, and provide opportunities for important instructor feedback during the process. Our project was divided into three assignments with two parts for each, resulting in six separate submissions. The first assignment had two parts: an individual submission and a team submission. This technique allowed students to receive both individual and group feedback early in the term.

General guidelines for team formation

Providing guidelines for team formation is critical for team success and cannot be overemphasized. Team formation guidelines help students choose team members intelligently, aid in the formation of team member roles, and help provide a basis for mutual respect among team members. General guidelines for creating teams were presented both by the professor (Dr. Fornshell) and by a guest professor (Dr. Abramson) during the weeklong, on-campus session. The importance of having a balance of skills on the team was emphasized. Additionally, the various roles in the instructional design team were discussed so students would have an idea of what skills were necessary and important to have on the teams.

Allocating time for team relationship building

Relationship building allows team members to get to know and appreciate one another's strengths and weaknesses, facilitates the initial ideation stage of project development, and lays the foundation for a successful collaborative experience. When it comes to team relationship building, NSU's DCTE program structure and other hybrid programs (having both on-campus and online requirements) afford, in my opinion, an advantage over purely online programs.

The weeklong, face-to-face session at the beginning of the term provided time and proximity for team relationship building. During the week, Dr. Fornshell built ample time into the schedule for students to mingle and form teams. He also provided opportunities for the teams to meet and begin to formulate project plans. Important brainstorming sessions enabled our team to discuss several options before finally settling on the photography idea.

Maintaining a presence with students

It is very important in online courses for the instructor to maintain a presence with the students. Dr. Fornshell accomplished this by assuming the role of an office manager for all the design teams. He sent timely emails, which served to help manage the various teams and to ensure that things were proceeding smoothly with the groups. He also provided models for unfamiliar products, such as examples of flowcharts and representative storyboards. These project requirements needed additional explanation because the finished products were dependent upon the context in which they were developed. Dr. Fornshell managed to achieve a delicate balance between providing

enough guidance and allowing teams sufficient freedom. I never felt like he was micro-managing the project.

Student Factors

Instructors can only do so much to facilitate rewarding collaborative learning experiences. In the final analysis, team members play an important role in the success of the project. Our team (the ShootSmart group) consisted of four members with varied backgrounds. Randy (from New Jersey) is a technology coordinator for a K-12 school district. Bob (from Connecticut) is in charge of technology staff development at his K-12 school. Chris (from Germany) teaches technical English at the university level. I (Bruce) am from Tennessee and teach art at the elementary level. I was also a landscape architect for 15 years prior to entering the field of education. Our ages range from 26 (Bob) to 46 (me). In what follows, are personal reflections on factors, which I believe were important in making our group successful.

Defining team member roles

The diversity of backgrounds was our team's strength. It made defining team roles a natural process. Clear and distinct roles aided in team communications and gave members a sense of responsibility and importance. They also assisted in assigning work responsibilities and made project management easier. Our roles were project manager (Randy), SME (me), Web design/layout (Bob), and Web programming (Chris). Because Dr. Fornshell provided considerable latitude in determining instructional units, our team was able to choose a subject that fit our varied backgrounds. It was no accident that our team chose photography as its unit of instruction. Because I did not have the level of technical expertise that my cohorts had, a decision was made to choose a subject in which I was the SME. This decision empowered me to make a significant contribution to the team.

Defining team member responsibilities

Project responsibilities proceeded directly and naturally from team member roles. Responsibilities and authority in the given areas of responsibility were well defined. While some overlap existed, individual team members were given more decision-making authority in their various areas of expertise. This principle was used throughout the ShootSmart project and was helpful in resolving disagreements.

Establishing team goals

Team goals should encourage a standard of excellence, be challenging yet reasonable and doable, and be agreed upon by all team members. Our group used online synchronous meetings to gain consensus on goals. The accomplishment of those goals was celebrated online throughout the course of the project, as each deadline was met.

Establishing team deadlines

The major deadlines were set by the professor and were based on experience teaching the class. However, team members also had the opportunity to establish sub-deadlines. These were set well before the actual deadlines to give members time to review and correct work prior to submission. Additionally, major portions of work were subdivided in order

to meet schedules. In collaborative efforts, the project manager, by virtue of his role and responsibility, should have more authority in setting deadlines. However, team members must also be convinced that the work can be done in the allotted time. Once set, team members should hold each other accountable for meeting deadlines with encouragement and weekly meetings.

Guidelines for team communications

In order for collaboration to work, team members must be respectful and considerate of one another, must understand that everyone's opinions and thoughts are valued, and must be open and honest with communication (frankness is desirable for group members as time is critical). Our team communicated in a professional manner. We managed to balance respect and consideration with open frankness. There were disagreements, but they were resolved in a civil manner. The fast pace of work demanded that members communicate in an honest, clear, and concise manner.

Guidelines for resolving differences of opinion

Conflicts concerning the project were resolved by listening to all arguments, debating, and coming to a decision. Decisions were based on ideas and not on personalities. Team members were concerned with the quality of the project and different perspectives were considered important for developing good solutions to problems. As project manager, we looked to Randy when consensus could not be reached. In the rare cases where there was an impasse, we put the issue to a vote. We were each voted down at least once during the project. The project was better because of these healthy debates.

Scheduling regular online synchronous meetings

Of all the communication tools used during the project, the weekly AOL Instant Messenger (AIM) chat room meetings were perhaps the most important to the success of the project. We established a time to meet each week, and followed through on these meetings throughout the term. The time was 4:30pm Central to accommodate everyone's work schedules. It was 11:30pm for Chris, who was in Germany.

These meetings were extremely productive and were used for a variety of purposes. In addition to brainstorming, resolving problems, coming to consensus, setting time schedules, maintaining enthusiasm through group synergy, and generally having fun, these meetings were also used to refine papers prior to submission. The time difference worked well for the team. After one of our online meetings, Chris (in Germany) would go to bed and the rest of us would continue to work through the evening. When Chris woke the following morning, his email would be waiting with attached content to integrate into the Web-based courseware.

Other means of team communications

In addition to the weekly online meetings, we used email with attachments to follow up discussions and to send subject matter content for inclusion into the ShootSmart Web site (Curry, D.B., Johnson, C., Palmer, R., & Polselli, R.N., 1999). The attachments were mostly in the form of Word documents and PowerPoint files. The subject matter content was sent in PowerPoint files, which acted as mockups for the individual Web pages. Additionally, Chris created a private, threaded discussion forum and Randy created a

Web page for posting the project schedule and due dates.

Summary
Online collaborative project-based courses can be extremely rewarding experiences if certain elements are present. A thoughtful instructor, capable of balancing guidance with freedom is one critical factor. Another is a team with the skills, both technical and social, to truly collaborate. When those two factors and all they entail come together in a learning environment, collaborative projects can result in outcomes far exceeding the expectations of the professor. Such is the case in this example. The friendships formed through this collaborative process are strong to this day. The ShootSmart team remains intact and each of us benefits continually from the mutual encouragement we receive from one another in the online learning environment. This collaborative, connected, learning experience is truly the highlight of my educational career, thus far.

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The Lions and the Hawks: Using Videoconferencing and Web Technology to Deliver a Cross-Campus New Product Innovation Course

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Introduction

This paper describes the development of an educational partnership between two disparate and geographically separated institutions - Penn State University (PSU) and Saint Joseph's University (SJU) - that is specifically focused on the food industry and, more specifically, the development and launch of new food products. This partnership features a new product development (NPD) and innovation management course that links the students and faculty of PSU and SJU for the purpose of leveraging the respective competencies and specialties of the two institutions: food science and agribusiness at Penn State and food marketing at Saint Joseph's. We will discuss how this unique partnership began, what we hoped and hope to accomplish, how the parameters have evolved, the educational and information technology used to support our joint efforts, what we have learned about both educational partnerships and technology during three years of working together, and next steps for the future.

Background

Organizations in today's business world increasingly rely on outsourcing, partnerships and strategic alliances across a wide range of business processes and activities. Much of this is fueled by a belief in the strategic management theory of core competencies. This theory holds that organizations learn to perform a set of activities or processes very well and that a firm's strategy should be based on leveraging these competencies. Adherence to this theory leads to narrowing the scope of activities performed by all but the largest and most diversified firms, giving rise to the need for substantial outsourcing and the growth of partnerships and alliances between organizations with complementary competencies. Similarly, educational institutions possess different competencies or skill sets, and this, along with increasing financial pressures, has led schools and colleges to seek educational partners.

Saint Joseph's University is a small (3400 full time undergraduate students), private, comprehensive Catholic university located in Philadelphia. Saint Joseph's is one of 28 Jesuit colleges and universities in the U.S. In 1960, when Saint Joseph's was a much smaller (1800 students, all male) college, some leaders of the retail food industry in Philadelphia created a plan to found an Academy of Food Marketing, designed to offer professional education to young people in order to prepare them for management careers

in food retailing. The Academy, through a combination of circumstances, became part of Saint Joseph's College, and began offering an undergraduate major in food marketing in 1962. It should be noted that the angle that "sold" Saint Joseph's on the Academy was that of addressing problems of world hunger, consistent with the social mission of the Jesuits. While that remains a real concern, the primary emphasis of the food marketing program at Saint Joe's is to educate undergraduate and graduate students and to serve the food industry.

Over the past forty years, the food marketing major has expanded its scope to the food supply chain "from farm to table" and has become the largest major (with 350 enrolled students) on campus. Saint Joseph's University has become known for its food marketing program, which has received tremendous support from the food industry. The business school is named for Erivan Haub, owner and CEO of Tengelmann, one of the largest food retailers in Europe, and majority owner of the A&P food chain in the U.S. The USDA awarded Saint Joseph's a grant of over $12 million to establish a Center for Food Marketing. The activities of the Academy of Food Marketing are funded solely by grants and gifts from the food industry. As a result of both USDA and private funding, a new business school facility was built to meet the needs of students in the 21st century. The new building was designed to incorporate the latest technology. Mandeville Hall, which opened in September 1999, has enabled student to have access to global resources and to interact with colleagues and subject matter experts from around the world.

The College of Agricultural Sciences at the Pennsylvania State University, through the Departments of Food Science and Agricultural Economics and Rural Sociology, offers undergraduate and graduate degree programs in food science and in agribusiness. As a land grant institution, Penn State has distinctive competences in agricultural research and education as well as a very distinguished track record in the food science and technology areas. Penn State's Food Science program is considered a leader in the field and its specialty courses in ice cream and chocolate processing are recognized as the best in the industry.

During the mid-1990's, a group of Penn State faculty members, from both the food science and agribusiness areas, created a cross-disciplinary new food product innovation course, taught primarily to undergraduates, which drew students from food science and agribusiness, as well as occasionally other majors. This elective course was team-taught in a non-traditional way, without formal lectures, using case pedagogy and a student food product development project as major learning vehicles and featuring the team approach to NPD. The course took the perspective and emphasized the food science and business aspects of the product innovation process.

Meanwhile, Saint Joseph's has offered a required senior level course in new food product development for over 20 years, with an emphasis on the marketing side of NPD, particularly the areas of market analysis and product launch strategies. As part of an attempt to create a dialogue between the St. Joe's and Penn State food programs, faculty had an opportunity to meet and discuss the respective courses. We (Lam Hood, Spiro Stefanou and Barry Zoumas at Penn State and John Lord at Saint Joseph's) concluded

that the approaches used at the two schools were complementary, and decided that a prime opportunity for an institutional linkage existed. So, starting in fall 1998, the two NPD courses have been linked so that SJU students can take advantage of the Penn State competences in food science and agribusiness while PSU students can learn much about getting their new product to market successfully.

Rationale and Objectives

The rationale for the partnership is simply stated: two faculties with complementary skills provide potentially more learning opportunities for students. New product development in the food industry involves both technical and business-marketing issues and decisions. In the real world, food companies combine people from a variety of disciplines, including sensory analysis, packaging, legal, production, engineering, finance, marketing, research, and sales, to complete the hundreds (sometimes thousands) of activities required to successfully launch new products.

Previously, the Saint Joseph's course had "assumed away" the various technical and production challenges, and allowed students to concentrate primarily on opportunity analysis, ideation, consumer testing, and creation of both consumer and trade launch programs, without having to consider issues such as, "is this product technically feasible?" As a result, students created products with compelling consumer benefits. However, in numerous cases, these products could not have been produced. On the other hand, while the Penn State course was very strong on the business and technical sides, there was less recognition and understanding of the launch process, that is, the process of "selling in" the product to the retail grocery trade and to the household or foodservice customer. This is a very significant issue - if a new product is not "on the shelf," it cannot sell. Similarly, if a food company does not build awareness, trial and repeat purchase, even a technically sound product is bound to fail.

The faculty envisioned several key objectives for the partnership. The first was to put food science, agribusiness and food marketing students together in a situation where each cohort could gain an appreciation of the issues and principles guiding the other, closely replicating what had to happen in the "real" world. The second objective involved the use of project teams, and the enhancement of students' understanding of team processes and ability to work productively in teams. Teams, of course, are of critical importance not just in NPD, but also throughout the business world, as team building and teamwork are two of the skills that virtually every employer seeks. Teams are heavily used in business education generally so project teams are not particularly unique. However, the reality of having to work in teams with geographically distant team members is unique to education, but increasingly important to business.

The faculty team also identified the improvement of presentation skills as a key objective of the course, and secondarily the ability to be comfortable making a professional presentation in a distance-learning environment. The other significant course objective was to give students exposure to and practice in communication technologies - videoconferences, audio conferences, email, chat rooms, threaded discussions - that are becoming increasingly important to organizations.

Chronology
Initial meetings among the faculty were held during the spring and summer of 1998 to identify the best path to take. We had an ultimate goal - to create one joint course for two different (in terms of institution, location, and discipline) student cohorts. We were, however, initially careful to avoid being overly aggressive; it was clear that "we had to walk before we could run." As it turned out, we had to crawl before we could walk. Our first step was to schedule the respective courses in order to have a common time slot, a task that proved to be a little tricky since the academic calendar as well as daily class times differs between PSU and SJU. So we had to do a little bit of creative scheduling, but managed to find a weekly time slot lasting about 1 hour and 40 minutes long (out of 150 class minutes at SJU and 115 at PSU) that overlapped.

Year 1 - Fall, 1998
Both schools had already set up and were using distance education, at least on a small scale, so videoconferencing facilities were available at both campuses. We discovered very quickly that it was necessary to have an engineer at both sites during the class to connect the two campuses via videoconference and to troubleshoot any problems as they developed. In addition the engineers controlled all of the technology required in the classroom during the presentations. The Instructional Designers at the respective campuses instructed faculty, guest presenters and students on how to use the technology in an effective and instructional manner. The Instructional Designers also offered suggestions to faculty, students and guest presenters when incorporating technology.

We decided that during the first semester of the partnership, we could "share" food industry resources, that is, each faculty enlisted some volunteers from the food industry to do guest lectures on campus on a variety of topics pertinent to new food product development, so the simple idea was to let the Penn State students observe the Saint Joseph's presentations and vice versa. This was fairly easy to arrange and all guest presentations were held during the "common time" using videoconferencing to link the two classes. So for the first time, Penn State students were exposed to in-depth presentations on the marketing aspects of NPD and the Saint Joe's students gained some insight into food science and agribusiness issues. During the first year (fall semester 1998) we attempted to use WebCT (hosted at Penn State) to make course information available to students. There were many issues that prevented us from going forward with using WebCT, and we wound up changing platforms for year 2.

We faced critical issues early on. The languages of the two disciplines are significantly different and that, as a result, students had some trouble grasping concepts contained in presentations from the "other" discipline. Students took a very passive approach to the guest presenters. Also, students were both unfamiliar and somewhat uncomfortable with the videoconference environment. As a result, there was a distinct and somewhat disconcerting lack of student participation. Students needed to learn how to interact in this environment and to understand that the technology will sometimes be a distraction. In addition, we needed to force students into a role that would encourage them to be a participant.

We asked speakers to send PowerPoint presentations a few days before scheduled presentations so that the slides could be available to students ahead of time on the course website. In addition, we asked speakers to break their presentations into sections with natural breaks so that students could be engaged and required to listen more actively. Requiring students to ask the presenter questions pertinent to their projects helped to make students more accountable. We also attempted to present the speakers in a logical order, consistent with the "flow" of the product development process, so that the topic sequence was more logical for the students and easier to follow.

Both student sections of the course used a new product development project as a key vehicle to apply learning; during fall 1998, these projects ran concurrently but separately between the two classes. At the conclusion of the semester, the winning teams from each campus made project presentations to a panel of judges that was split between Philadelphia and State College. Students were required to present their final project to their class at their campus as well as to the class at the other location via videoconference. Students needed to practice how to communicate to a local audience and at the same time present to an audience at a remote location.

The faculty required the student teams to use PowerPoint as a presentation vehicle. As expected, the Penn State team did an excellent job with technical and business issues but put relatively little emphasis on product launch. Moreover, the Penn State students did not cover ideation; instead, students were assigned a new product idea. On the other hand, the Saint Joseph's team developed a creative product with solid packaging and compelling advertising, and did an excellent job with the retail sell-in, but wound up creating a product (a beer flavored with liqueur targeted to women) that was neither legal nor technically feasible. While this outcome was not surprising, it clearly demonstrated that we had to take the partnership to the next level.

Year 2 - Fall, 1999

For our second go-round in the fall semester of 1999, we retained all elements of the previous year's partnership with several changes and additions. First, we adopted CourseInfo 4.0 from Blackboard as the web-based software for the course. CourseInfo allowed us to post all announcements and documents, including the course expectations and syllabus, staff information, student information, faculty presentations and notes, project guidelines and materials, and speakers' presentations, on the web. CourseInfo also provided communication capabilities for individual, group or class email messages, plus chat rooms and threaded discussions. We segregated course information by developing separate folders in Blackboard for SJU and PSU. Students were encouraged to use the diverse information supplied from both campuses. What we discovered was students did not investigate any material outside of their required area of study. In addition the course structure during this time did not encourage students to communicate with each other after class hours.

Our second major change for year two was that we doubled the number of cross-institutional industry presentations. Most weeks we featured a guest speaker at one

campus or the other, presenting via videoconference. Also, early in the semester we scheduled a half-day at the Hershey Technical Center in Hershey, PA to allow the students from both schools to meet and engage in some team-building and bonding, plus to hear a presentation by a Hershey Foods VP on new product development at Hershey Foods.

We formed "quasi-teams" that linked a Saint Joe's student project team to a Penn State team, and mandated that these teams consult on each other's projects: the Penn State students offered technical and business advice and guidance and the Saint Joseph's students provided help with the marketing and product launch. Students communicated using several different media. Some of the overlapping class time was set aside for student teams to hold on-line meetings using videoconference or audio conference. Students could also communicate on-line or off-line using the facilities of CourseInfo.

The biggest change for 1999, however, was the completion of a new business facility at Saint Joseph's University - Mandeville Hall, funded primarily by USDA and gifts from the food industry. Mandeville Hall features state-of-the-art technology, including videoconferencing and audio conferencing facilities, as well as multimedia presentation capabilities in all classrooms and conference rooms. This facility significantly expanded our communication and presentation capabilities.

Following a request from our Penn State colleagues, we also decided to include two other universities (Monterrey Tech, Mexico and Texas A&M) in our videoconferences. We ultimately discovered that with the available technology four-way videoconferences were unrealistic. The communication link needed for four way videoconferences compromised the quality of the transmission between Penn State and Saint Joseph's.

Year 3 - Fall, 2000

Besides adopting an upgrade of CourseInfo, to version 5.0, the major leap forward was to create a true multidisciplinary, cross-campus course with a common syllabus and cross-institutional project teams. This took student interaction between the two campuses to a significantly higher level. We wound up, ultimately, with four project teams, each comprised of 3-4 SJU (food marketing) students and 2 PSU (food science and agribusiness) students. The project expectations were jointly decided by the faculty and were identical for both student cohorts. Each team was assigned a food company, did some preliminary market and consumer analysis to identify a new product opportunity, created a new product idea, and executed (or simulated) all of the activities involved from concept development through launch.

Teams met in person twice at the Hershey Technical Center; some joint class time was set aside for student meetings at a distance; and students used email, chat rooms, and additional audio and videoconferences to get together and execute their project. Each of the four faculty members served as a mentor/facilitator for a team. The teams made two preliminary presentations during the semester, a presentation of their business plan to the faculty, simulating a food company management committee, and a final "sell-in" presentation to two supermarket buyers at the conclusion of the semester. All of the

presentations were carried out via videoconference, and all the student teams used PowerPoint.

Spiro Stefanou, an expert in student assessment methodology, had created an elaborate assessment program for the course when it was first offered at Penn State. This methodology involved formal peer and team assessment by each team member at three junctures of the course, with feedback to the teams after the first two (mid-semester) evaluations. For year 3, we adapted this assessment program to the cross-institutional project teams. We found that these assessments helped to highlight perceived shortcomings and get teams to function more effectively. Of course, the fact that 20% of the course grade was based on the final peer evaluation scores served as an important motivator for effective teamwork.

The Experience: Highlights and Lowlights

After three semesters of the Penn State-Saint Joseph's joint new product development course, we have reached several conclusions. First, philosophically and pedagogically, the partnership makes great sense. Students really benefit from seeing the whole picture of the NPD process. Second, the participating faculty members have learned a great deal from each other, enhancing our ability to effectively teach new product development and innovation. Third, the food industry seems to embrace our educational approach; virtually everyone we have spoken with indicates that more of this type of cross-disciplinary, team-based education is needed. Fourth, the students who have completed the course, while experiencing many frustrations caused by a very different way of doing things, understand that their exposure to this unique educational approach does prepare them well for dealing with some of the challenges they can expect to face in their careers.

On the other hand, this is by far the most demanding course any of the participating faculty members have ever taught (and the combined experience exceeds 75 years). The amount of planning and coordination proved to be much more than any of us expected, as is the frustration created by technical problems with videoconferences and the course web platform. We have found that trial and error is the only real way to learn about the nuances of various technologies and much of the trial takes place during class. Despite outstanding technical support at both campuses (faculty members were responsible for course content and process, but instructional design and technology specialists set up and ran the videoconferences and provided access to CourseInfo), there were frequent times, especially in years 1 and 2, when things simply did not work. We learned from each occasion, made numerous changes, and improved dramatically from year 1 to year 3. But we found that students expect television quality, first time and every time. They are intolerant of technical problems, even those we solved relatively quickly. Students admitted that sometimes even minor technical glitches caused them to "tune out," rendering our efforts, and those of industry experts, much less effective.

We also found that the distance between Philadelphia and State College (200 miles) and differences in campus culture and scheduling create real and significant barriers to effective teamwork. Despite the attention to and opportunities for team-building, creation of formal team contracts, faculty mentoring, and setting up numerous and frequent

opportunities to communicate, all of the teams had problems "getting together" and the teams functioned much less effectively than we expected. The team of faculty and instructional design specialists noted that students were used to a more structured approach to receiving information and communicating with the professor and colleagues. Students rarely took the initiative to investigate how they could communicate and research information in ways different from those they have typically used to accomplish those tasks.

Students were frustrated with having to communicate with their groups at a distance. Very different class schedules between the two campuses and among team members, and the task of arranging facilities made it difficult to find times when teams could meet to discuss their projects. They limited themselves to communicating using videoconference and audio conference technologies. Team mentors took some of the initiative to arrange and oversee team meetings, but this effort was not equivalent across the four teams. Students did not take advantage of other available technologies. They were encouraged to use CourseInfo (using chat rooms, threaded discussions and email) to communicate within their groups, but generally did not utilize these means of communication. Final presentations in year 3 demonstrated that cross-functional teamwork helped to prevent egregious errors and omissions from the new product development projects. However, the overall quality of the four group presentations was uneven.

It is interesting to note that two of the major reasons cited for failure of new products are: (1) a new product idea is ahead of its time, and (2) the new product requires a significant behavioral change on the part of the consumer. Analogously, our attempt to use cross-campus, cross-disciplinary partnerships requires a significant change in both student and faculty behavior. And like any other innovation, it takes a while to successfully effect such a change, and it happens only gradually.

Next Steps

Year 4 of the PSU-SJU partnership will take place during the fall 2001 semester. The guiding philosophy and key objectives of the partnership remain the same but the details of implementation are going to change somewhat. We will have common class time each week for guest speakers and cross-campus instruction. The courses at Penn State and Saint Joseph's will run parallel but separately. We will share resources, including faculty resources, as we have done. In fact, the faculty members will take a more active role in working with students at the other campus. And we will continue to have a common course syllabus and website so that students at both campuses have access to all course materials and can communicate with each other. And we will have the same project expectations at both schools. The teams will be school-specific. We are not backing away from the cross-institutional model but we are adjusting our approach until we learn how to make cross-campus project teams work more effectively.

In order to generate the benefits of the unique discipline focus at each school, we will set up opportunities during our joint classes for students to advise and critique their counterparts. SJU students will be required to incorporate technical and business issues in their projects, and they will receive advice and counsel from PSU students on these

issues; similarly, the SJU students will help the PSU students with their marketing programs and launch plans. Both preliminary and final project presentations will involve both groups of students presenting via videoconference, plus questions from judges for all of the groups at both schools. In this manner, we hope to maintain the benefits of the partnership but minimize the problems and frustrations.

Conclusion

Partnerships and alliances are a fact of life in the business world, as is the need for effective team building and functioning. To the extent that students can learn these skills in addition to normal course content, we enhance the value of our students' education. Advances in communications technology provide increasing opportunity to teach these skills. This paper describes one educational initiative that, using videoconferencing and web technology, has linked two campuses, two faculties and two groups of students. Much was accomplished, but much more needs to be done to make such a partnership truly viable.

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Facilitating asynchronous distance learning
Exploiting Opportunities for Knowledge Building in Asynchronous Distance Learning Environments

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Abstract

Computer mediated communication tools enable today's distance learners to engage in collaborative problem-solving, threaded discussions, and peer tutoring through asynchronous distance learning environments. The authors suggest that these are best accomplished by establishing virtual learning communities, which break down traditional instructor-as-transmitter, learner-as-receiver roles and instead promote a more learner-driven environment. In virtual learning communities, members share mutual responsibility for each other's learning. So what implications are raised for the instructor/designer of virtual learning communities? Instructional strategies for facilitating online distance learning are identified and discussed. These include: instilling ownership through individualized content, projects, and assessments; making meaningful connections through goal-based exploration of content; collaborating through learning communities; encouraging reflection through moderated discussions; and representing complex knowledge structures through concept mapping. These strategies call for instructors to play a more facilitative role in the learning environment. Five facilitator roles are discussed: that of a guide, mentor, catalyst, coach, feedback-giver, and resource-provider. These roles give rise to several new competency requirements for online instructors.

Exploiting Opportunities for Knowledge Building in Asynchronous Distance Learning Environments

Distance learning began with one-to-one student-teacher relationships, whereby learners engaged content in isolation (e.g. through correspondence courses). Later, with the introduction of audio and video conferencing technologies, this relationship became one to many and feelings of isolation were reduced. Today's computer-mediated communication tools are used to create rich learning environments where many-to-many relationships can flourish. At the same time that technological advancements are improving our capacity to deliver instruction at a distance, two forces are reshaping

education and workplace learning: the reexamination of what learning means and the willingness to reconsider instructional formats.

Redefining learning

Foshay and Moller (in press) define learning, from a constructivist viewpoint, as a process that prepares learners to create knowledge and solve ill-structured problems through transformative or generative processes (p. 6). Ill-structured problems are native to a particular context, involve tasks that are non-routine, and often lack a singular answer. At the heart of the learning process is an emphasis on critical thinking, creativity, collaboration, dialogue, and argumentation directed at solving those problems and providing continuous learning opportunities (Preskill & Torres, 2000). This differs from traditional viewpoints in that it places the learner, not the instructor, at the center of instruction and defines learning as a process rather than a product of instruction.

Redefining instruction

While many educational policies and systems, originally created during the industrial age, are successful in managing the educational process; they are not designed to support natural human learning abilities (Marshall, 1997). In order to support learning as a knowledge building process, learning environments need to allow for context, collaboration, and practice to co-exist (Barab & Duffy, 2000). There is a need for learner-centered environments that enable students to analyze and share ideas as well as apply their knowledge in a real world context (Land & Hannafin, 2000).

This knowledge building approach is the basis for the strategies, roles, and competencies presented and has significant implications for both how people learn and how people work, more so as socio-economic conditions and other factors progressively blur the boundaries between learning and working.

Strategies for facilitating

Though much attention is given to technology's increasing role in distance learning, equal (if not greater) consideration should be given to the design and delivery strategies used to implement instructional technology. Though technological advancements have enhanced and will continue to improve distance learning environments, and though the role of the instructor has changed dramatically, there has never been a greater need for high quality, facilitative leadership in the virtual classroom.

It is critical that online instructors use strategies that enable learners to contextualize problems, personalize meaning, and exercise choices. To obtain a level of learning that is consistent with knowledge building requires reflection, exploration, and collaboration, which foster learning that is intrinsically motivating. Knowles (1975) supports the use of these methods, suggesting that learners are motivated by internal incentives, such as self-esteem, achievement, personal growth, sense of accomplishment, and curiosity -- all by-products of collaborative problem-solving activities. Raising levels of intrinsic

motivation can improve satisfaction with the learning process and learner achievement levels (Cordova & Lepper, 1996). The level of interaction among online learners is influenced heavily by the structure of the course (Vrasidas & McIsaac, 1999), which is often driven by the strategies employed by the instructor. So what instructional strategies support a learning environment that intrinsically motivates learners? Several strategies have been identified and adapted to support knowledge building for online distance learning (see Figure 1).

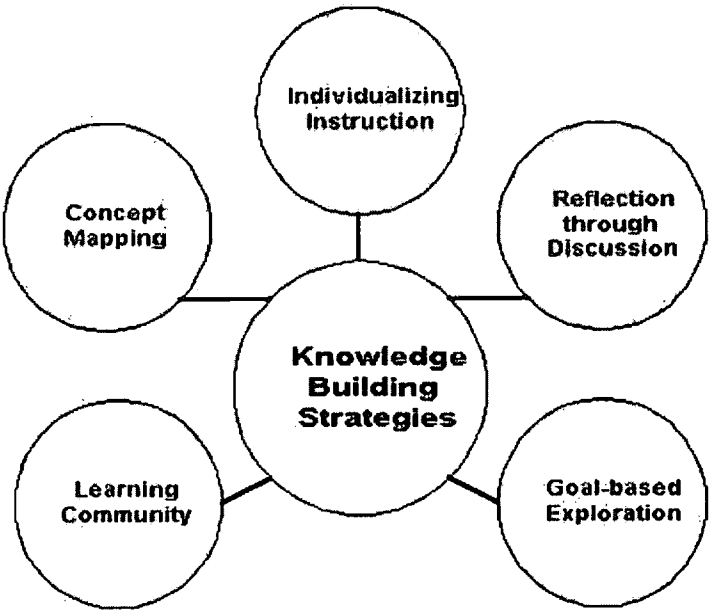

Figure 1: Knowledge building strategies for online distance learning

Individualizing instruction

One way of capturing and holding learner interest is by individualizing instruction, i.e., allowing participants to control the learning process and contextualize their learning experiences in a way that is meaningful to them (Sisco, 1997). When separated by time and space from learners, instructors no longer have the level of control over the learning environment that they enjoy in classroom settings. Online instructors are able to view chat room transcripts, emails, threaded discussions, and presentation spaces as means of monitoring outputs and have access to empirical tracking data, but they have little insight into what the learner is experiencing off-line. If for no other reason, this makes online instruction highly reliant on the learner's sense of self-accountability and self-organization.

Instructors and designers can build flexibility into their online courses in terms of how projects and assessments are structured and what content is explored by enabling learners to make important choices that shape their learning experience. By giving them responsibility and control, learners develop ownership of the process. Several researchers

have shown a correlation between ownership and learner satisfaction (Cole and Glass, 1977; Pine, 1980), which in turn leads to greater interaction with the learning environment and a higher sense of accountability. As Hootstein (1994) points out, making content interesting is less important than making learners interested.

In addition to individualizing the needs assessment and content portions of their courses, feedback systems should also be individualized. Often, peer evaluations are used to provide feedback on assignments. Unfortunately, peers may not always be thorough or candid enough in their assessments (Vrasidas & McIsaac, 1999). Therefore, it is important that instructors also play an active role in providing positive and constructive feedback that is timely and personalized. This will help prevent online learners from drifting away from the course because of feelings of disconnection.

Goal-based exploration

One school of thought suggests that learning experiences should be organized as task-oriented or problem-solving activities (Knowles, 1975; Jonassen, 1994). Blumenfeld, et al, (1991) submit that learners must perceive that projects are interesting and valuable. Too often projects are developed and disseminated without sufficient appreciation for the complex nature of the student motivation and knowledge required to engage in cognitively difficult work (Blumenfeld, et al, 1991; p. 373). Seifert (1997) suggests that the facilitator should help learners identify problems that are valuable to them, then structure content, resources, cases, and activities around the problem. This goal-based approach gives learners focus and ownership in their learning quest as well as a source of achievement and pride. In traditional classroom activities -- often due to time limitations, competing interests, and motivation within the class -- instructors sometimes reduce task difficulty, overlook errors, de-emphasize failed attempts, and ignore faulty performances (Clifford, 1990). In order to be motivating and to facilitate transfer of knowledge to real-life performance environments, problem-based activities should be worthy of the learner's time and effort, intellectually demanding, and most importantly contextual (i.e., full of the intricacies of reality). In other words, problems should be messy and draw upon multiple disciplines (Shank, 1996). If learners do not perceive the problem to be realistic or relevant, they will not be motivated to find a solution.

Collaboration through communities

According to social constructivists, learning is a social construct mediated by language via social interactions (Vygotsky, 1978), where collaboration among learners is a critical concept forming element (Jonassen, 1994). By establishing supportive learning communities, online instructors can harness the power of conversations. The learning community can provide social reinforcement and information exchange (Moller, 1998) as well as the opportunity to increase self-esteem and self-efficacy, which act as internal sources of motivation, and may improve satisfaction and achievement (McIsaac & Gunawardena, 1996). In fact, a study of several hundred undergraduate online students by Navarro and Shoemaker (2000) confirms that learner-to-learner interactions have a higher correlation (p=.24) to performance than learner-to-instructor interactions (p=.10).

Collaboration can be encouraged through the use of threaded discussions, debates, team-based problem solving simulations, group reports, brainstorming sessions, and peer coaching (Harris, 1999).

In a survey of an online graduate course, a significant number of students reported high levels of satisfaction (70%) and that collaborative work reduced their tendency to procrastinate (60%) (Kitchen & McDougall, 1998). On the other hand, online students also indicated frustration with the inherent time delays and subsequent time pressures involved with asynchronous team-based project work. To facilitate team building, project planning, and task coordinating, learners could supplement their asynchronous modes of communication with synchronous ones (e.g., chat rooms, face-to-face meetings, and audio or video conference). In situations where class members do not have access to synchronous communication tools, learners can agree on times and synchronize their use of email, bulletin boards, etc. to approximate synchronous exchanges.

Another collaboration tool available to online learning communities revolves around the idea of virtual presentation spaces. Typically referred to as computer-supported intentional learning environments (CSILEs), learners have access to a common online database into which text, schematics, charts, etc. are uploaded and made available for viewing and contribution (Jonassen, et al, 1995). Here learners can share their ideas, results, project outputs, etc. with team members, the instructor, or the class-at-large. Yet another tool, computer-supported collaborative work (CSCW), enables group members to view, make decisions about, and edit shared files. This can be a particularly valuable tool for developing high performance teams in the workplace, which more and more consist of geographically dispersed members working independently within one or more goal-oriented teams.

These computer-mediated communication tools, together with well-designed course structures and proper execution by the instructor, enable members of online communities to support each other, learn from one another, socialize, and collaborate. From a constructivist viewpoint, these functions are critically inter-related. It is easy, however, to understand why an instructor may assume that the unseen asynchronous distance learner, acting independently in an individualized environment, is self-motivated and in no need of community support. Furthermore, it is understandable that some instructors depersonalize their asynchronous distance learners in the absence of traditional classroom relationships. However, those attitudes deter learning achievement. The learner, although separated by time or space from others, still needs to feel a sense of belonging to a community and to benefit from such support and collaboration (Moller, 1998; Cairncross, 1997; McIsaac & Gunawardena, 1996; Moore & Kearsley, 1996; Kember, Murphy, Siaw, & Yuen, 1991). An instructor who actively plays a facilitating role and employs strategies that encourage high level thinking, reflection, and group interaction will maximize the effectiveness of online knowledge communities.

Reflection through discussion

Another strategy that instructors can use in knowledge building involves facilitating reflection through discussion. DeBard & Guidera (1999) suggest that the asynchronous nature of computer-mediated communication encourages more in-depth reflection and more meaningful discussion than is possible with face-to-face instruction. In classroom discussions, participants react and respond to one another in fast-paced exchanges of ideas that often end with neither side having the opportunity to reflect on those ideas, at least not until after the dust has settled. On the other hand, without time constraints, the asynchronous distance learner follows a more reflective process (see Figure 2).

1. Reads posted messages and supporting materials
2. Reflects and formulates a response
3. Possibly explores supporting resources (e.g., online experts)
4. Crafts a structured response
5. Edits, assesses, and possibly revises response upon reflection
6. Presents written response (maybe adding visuals and supporting links)
7. Receives the same type of consideration and feedback from peers

Figure 2: In an asynchronous discussion, the learner typically...

In a quantitative study of asynchronous online courses, Althaus (1997) reported that average responses in electronic discussions contained over one hundred words, while in-class responses averaged only about a dozen. In another study Sannomiya & Kawaguchi (1999) revealed that asynchronous, computer-mediated communication (as compared to face-to-face communication) tended to include less references to personal episodes; contained a lower proportion of ill-structured, disjointed sentences; and included significantly fewer number of repeated and unnecessary statements. In short, asynchronous communication can provide an excellent medium for reflection through discussion.

Bonk, Malikowski, Angeli, & East (1998) discuss a study involving an online learning community established for undergraduate Educational Psychology majors. Students were asked to create vignettes based on their earlier field (teaching) experiences, post their cases to a bulletin board, and respond to the cases of fellow students by means of online, threaded discussions. Twelve facilitators moderated the discourse. In a six-week period, 146 students posted 229 cases and 1,320 case-related responses (averaging 110 words per response). Though one may question the quality and thoughtfulness of the postings (justified opinions and claims were evident in only 9% of the responses), the sheer

volume of postings is indicative of the strategy's potential for generating active discussion.

Moderating active discussions

Discussions can be generated by posting thought-provoking questions to the class or by asking student-facilitators to initiate and moderate their own discussion groups. Berling (1999) suggests encouraging students to generate questions of their own, as part of an effort to teach students to become more like teachers. For example, a course site could have several online discussion forums organized around pre-determined topics. Each student-facilitator or moderating team is assigned a forum. The instructor scaffolds the process by providing guidance and supporting materials that offer information about roles and techniques. Students are responsible for generating interest in the discussion, laying down ground rules, moderating exchanges, and later synthesizing the ideas explored by the discussion group. In this way, the participants experience meaningful interaction that prompts reflection and thoughtful exchanges. The student-facilitators further benefit from both the moderating experience itself and the opportunity to distill the group's ideas, raising it to a higher level of organization (Cobb, 1999: p. 15).

Moderators can use active questioning techniques to prompt and encourage thoughtful discussion. Christensen (Discussion Teacher, 1991) offers a taxonomy of questions (see Figure 3), which can be used to raise the level of academic inquiry in discussion settings.

Diagnostic questions	(What is the cause of...?)
Prediction questions	(How do you predict these two chemicals will react?)
Hypothetical questions	(What would have happened if...?)
Action questions	(What steps should the company take?)
Questions of priority	(Given this situation, which is most critical?)
Questions of sequence	(Given these limited resources, what should be done first?)
Questions of extension	(What are the implications of your conclusion for...?)
Questions of generalization	(Based on your studies, what are the major elements...?)

Figure 3: Sample of probing questions from Christensen (1991: pp. 159-160)

Through the proper use of questioning techniques, discussion moderators can raise or lower the level of abstraction; redirect the discussion to fit a particularly need; drill down

into areas of interest; challenge assumptions and generalizations; and help participants consider the subject in new ways.

Concept mapping

Concept maps are cognitive tools, generally in the form of diagrams, which help learners visually and concretely depict their understanding of a particular knowledge set. They can depict strategic and tactical organization, relationships, hierarchy, sequence, and a host of other subtleties, enabling instructors and learners to communicate meaningful ideas on several levels at once. This rich medium offers instructors a way to assess various levels of development and understanding (Choi & Hannafin, 1995) and gives learners a powerful means to organize and communicate their ideas.

Concept maps can also be used to help learners think more strategically about what and how they learn. Consider this example. As Brandt (1997) noted, the amount of information which one has to wade through on the Internet vastly exceeds the amount of information required for a given need (p.112). This cognitive overload is often a source of anxiety for learners in web-enhanced courses. Grabowski, Koszalka, and McCarthy (1998) developed a handbook for use in a web-based graduate course. In it, the content (a myriad of links to web-enhanced instruction resources) is organized around an over-arching concept (the WELES model) and structured using a matrix approach. In this course, students are also asked to collaborate in developing their group's own unique concept map. As a result, learners are able to build on the instructor's basic framework, creating new concept models that are personally meaningful. Supporting the learner's strategic understanding of the content facilitates information processing and high order cognitive skills. Recognizing that many learners have difficulty with strategic thinking and that some may even find it challenging to represent their ideas visually, it is prudent to scaffold these concept-mapping activities with multiple supporting examples and to involve at least some element of group collaboration.

The roles of a facilitator

Instructors of online learning communities typically play multiple roles including that of designer, facilitator, administrator, and technical support (see Figure 4). Of these, the most visible and possibly the most important role is that of a facilitator. The facilitator role involves establishing, maintaining, and shaping the learning community. Six critical roles associated with facilitation have been identified, including that of a guide, mentor, catalyst, coach, feedback-giver, and resource-provider.

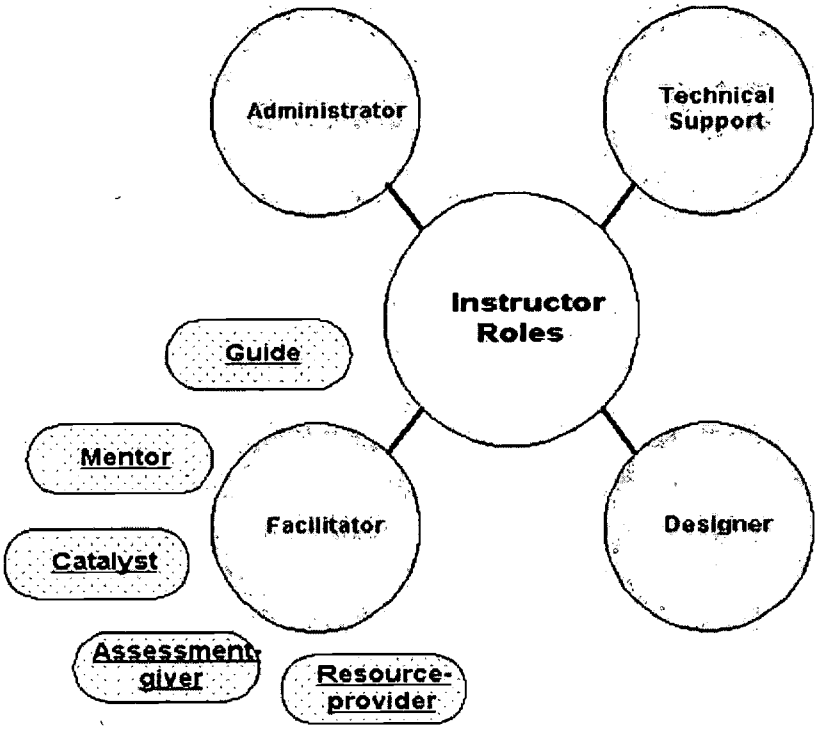

Figure 4: Roles of an Instructor working in an online distance learning environment

Instructor as a guide

Regardless of the medium, distance learning environments are generally foreign to new participants. Though many people today are familiar with email, for example, a learning environment that employs email and listservs as collaborative learning tools can, at first, seem awkward. A critical component of the facilitator's role, therefore, is to help participants become climatized to their new environment so that the technology becomes transparent (Berge, 1995). Online learners will need to familiarize themselves with technical issues (e.g., posting messages and uploading assignments); communications issues (e.g., feelings of isolation, uncertainty, and lack of confidence); social issues (e.g., expectations of learners being mutually responsible for each other's learning experience), and learning process issues (Bailey, 1998). This implies that the facilitator will need to take a leadership role early in the process, promoting a change of mindset. The facilitator must, for example, help learners break out of their stereotypical roles of information-receivers into roles of information seekers, explorers, and users. As learners become adjusted to the environment, the facilitator should encourage them to exert greater control over the process. The facilitator can then become less of a leader and more of a guide, while students transform from passive participants to active learners. Over time, even guidance and scaffolding should be gradually reduced, fading to the point that learners can function independently (Choi & Hannafin, 1995).

Instructor as a mentor

On the first day of class, by way of introducing herself, an instructor describes a recent failure then gives students in the class an opportunity to tell their own stories. Before long, students comfort each other and their instructor with the many lessons learned. This icebreaker and subsequent interactions set a tone of discussion, candor, and freedom from fear of embarrassment. Every classroom, live or virtual, has a particular culture of teaching and learning (Tishman, Perkins, & Jay, 1995: p. 1). An instructor can and should take the lead in establishing a productive culture by modeling positive norms, values, and behaviors. In doing so, the facilitator can establish a culture of risk-taking, collaboration, and self-criticism (Berling, 1999). This goes beyond merely enforcing rules of etiquette.

Instructor as a catalyst

A catalyst is something that causes activity between two or more people or forces... (Webster's, 1996: p. 231). Moore and Kearsley (1996) describe three ways that facilitators prompt meaningful interactions: learner-to-content (through exploration of learning resources); learner-to-instructor (through coaching and assessing); and learner-to-learner (through group interaction). This last type is of most interest to the authors as it represents a relatively new capacity of distance learning - to enable students that are separated by time and space to form an academic support community. Thanks in part to computer-mediated communications tools, students can interact, collaborate, and support each other's learning as previously could only be done in live classroom environments (Romiszoswki & Ravitz, 1997; Berge, 1995).

Instructor as a coach

A coach provides formative feedback that helps learners expand their mental models and grow their knowledge base beyond the superficial. This can include directing learner attention, reminding of overlooked steps, providing hints and feedback, challenging and structuring ways to do things, and providing additional tasks, problems, or problematic situations (Choi & Hannafin, 1995: p. 62). A good coach challenges learners by presenting new ideas, multiple perspectives, and underlying themes. In a learning community, coaching can and should be performed by all members. Still, even highly collaborative learning communities are sometimes prone to the stifling phenomenon of groupthink. For this reason, it is vital that facilitators work with individuals and groups -- moderating discussions, posing questions, and challenging assumptions -- in an effort to raise the level of academic inquiry. In describing the often conflicting roles of an effective discussion moderator, Christensen (Premises & Practices, 1991) said, The (instructor) is planner, host, moderator, devil's advocate, fellow-student, and judge (p. 16). Knowing when to wear which hat is the key to the art of facilitating.

Instructor as an assessment-giver

To the extent that the goal of an instructional program is to improve performance, it is important that learners be given an opportunity to showcase their newfound skills. Brooks & Brooks (1993) recommend that instructors work to remove traditional standardized testing in favor of assessments that are meaningful to learners. Traditional

standardized tests typically assess recall of factual data, rules, and procedures, sometimes also measuring comprehension. To assess higher level mental processes (e.g., problem solving, critical reasoning, decision making, etc.), however, assessments should be contextual and multi-disciplinary, both simulating real-life demands on the learner and challenging learners to synthesize content, contrast, compare, form value judgments, make decisions, and generate original thought.

Jonassen, Peck, and Wilson (in press: p. 3) suggest that the key to meaningful learning is ownership of the problem or learning goal. A critical question that instructors need to ask, therefore, is what situations arise in real-life contexts that would make challenging, engaging problems. These life-based challenges are often ill-structured, muddy if you will, yet they contain elements to which students can relate their prior experiences. A question that often arises with problem-based or case-based assignments is how to assess the quality of the learner's output, the solution. In asynchronous distance learning environments, evaluating a learner's process is as critical as considering the end product. After all, most post-assessments administered through asynchronous environments function as open-book tests. Therefore, the quality of the student's analytical dissection of the problem, the reasoning process, the ability to collaborate with peers, and the rationale that supports the findings should be of equal importance to, if not greater than, whether or not the solution offered is technically right or wrong.

Objective assessments (e.g., ones with multiple choice, true/false, and matching questions) can have a role in asynchronous distance learning environments. The authors suggest that these assessments be used for practice, self-assessment, and formative feedback. Navarro and Shoemaker (2000) suggest that electronic testing of important course content with instant feedback (p. 29) is important and, together with other factors, helps improve learner performance and satisfaction regardless of demographic factors, academic background, or computer skills.

Instructor as a resource-provider

In order to create a rich learning environment of exploration and growth, instructors must make available a wide assortment of learning resources. These resources represent the topsoil of learning. However, as Grabowski, Koszalka, and McCarthy (1998) point out, class materials quickly become out-of-date, inaccurate, or irrelevant to the day's lesson (p.2). The World Wide Web offers instructors a vast supply, often too vast, of current resources to use. Instructors should support learners by providing helpful search strategies and ways of reducing information overload. In addition, the use of today's communications tools (i.e., computer, audio, and video conferencing) can quickly put learners in contact with a large pool of expert resources. This access helps expand the learning community beyond the virtual walls of the classroom.

Competencies of a facilitator

Facilitating learners in asynchronous distance learning environments is highly challenging. The facilitator must be able to tap a wide variety of interpersonal helping

skills, such as empathy, respect, and genuineness (Brookfield, 1985, p. 7). Moore and Kearsley (1996) suggest that more experienced teachers may be better able to cope in this environment because they are better able to predict learner needs. This may be true to the extent that experienced instructors are willing and able to let go of long-held assumptions about learning environments. In a traditional classroom, for example, the learning community is built-in and feedback occurs naturally through the course of daily interaction. Whereas perhaps these can be taken for granted in a traditional classroom, they must be actively constructed in an asynchronous distance environment. Instructors unwilling or unable to assume this facilitative role, with the persistence required to overcome the technological and communicative challenges of online distance learning environments, may find the experience frustrating and unproductive.

Successful online facilitators are comfortable with dynamic environments, technology, and a lack of control, allowing students to control the direction of lessons, alter instructional strategies, and even modify content (Brooks & Brooks, 1993). Building a successful learning community takes a collaborative effort among individuals working in concert within the constraints of technological limitations and environmental factors.

Conclusion

The authors have discussed several strategies that can be applied to facilitate asynchronous distance learners:

- instilling ownership through individualized content, projects, and assessments;
- making meaningful connections through goal-based exploration of content;
- collaborating through learning communities;
- encouraging reflection through moderated discussions; and
- representing complex knowledge structures through concept mapping.

These strategies apply constructivist notions about knowledge building to computer-mediated asynchronous distance learning environments and operationalize the facilitator competencies and roles discussed. Though this is by no means an exhaustive account of strategies, roles, and competencies, it offers an alternative vision of distance learning - one that emphasizes the value of community, discourse, and meaningful interaction.

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Promoting Durable Knowledge Construction through Online Discussion

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Abstract
The success of online discussion is not happenstance. This paper focuses on practical advice for making online discussions educationally durable. This advice focuses on all stages of online discussions, from designing the assignment guidelines through summative evaluation. While this practical advice is grounded in the author's experience, it is more substantively grounded in a framework defining durable knowledge construction.

Introduction

Without proper guidance, online discussions can quickly digress into isolated bits of small talk and random cyber-chatter. These digressions inhibit student learning because discussions that have digressed don't lead students to a fresh and incisive understanding of course material. To avoid these dangers of digression, instructors shouldn't simply throw students into an online discussion and expect learning to happen. For online discussion to benefit students by promoting durable learning, instructors must meticulously design and facilitate discussion. Instructors also must understand how to broaden evaluation so that it, too, further facilitates durable knowledge construction. Before discussing design, facilitation, and evaluation, I define "durable knowledge construction."

What is Durable Knowledge Construction?

Elsewhere, I have offered a theoretical defense of online discussions by pointing to various theories and pedagogies. For example, I have pointed to literature that directly ties online discussion to the use of "computers as a cognitive tool" (Knowlton, forthcoming[a]; Knowlton, 2000). I also have connected online discussions to the synthesis between the private and academic selves (Knowlton, forthcoming[b]; Knowlton, Knowlton, & Davis, 2000). Finally, I have connected online discussions to the Writing-Across-The-Curriculum Literature (Knowlton, forthcoming[a]; Knowlton, forthcoming[b]). While all of these theoretical connections are valid, in this paper I examine "durable knowledge construction" as a heuristic for making decisions about the design, facilitation, and evaluation of online discussions. We can examine what I mean by durable knowledge construction by considering both "durability" in learning and the concept of knowledge construction.

Durability of Learning

When I talk of "durability" in learning, I am borrowing from Hacker and Niederhauser's (2000) assumption that learning should be "Deep and Durable." Hacker and Niederhauser define durable learning in terms of instructional strategies. Specifically, they argue that principles of active learning, collaboration, effective feedback, and motivation can make learning durable.

I agree with Hacker and Niederhauser (2000) (and I strongly recommend their article as a "good read"); but, for the purposes of this paper, I connect the notion of durable learning to a Taxonomy of thinking. Bloom's Cognitive Taxonomy (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956) can be used to measure higher order thinking skills. *Knowledge* and *comprehension* are the two lowest levels of Bloom's Taxonomy. These two lowest levels are not indicative of durable learning. In general, students focus on the knowledge and comprehension levels of learning as they prepare for multiple choice, matching, and true/false style tests. Such preparation focuses on memorizing isolated facts and understanding static relationships. Knowledge and comprehension are not durable because they quickly fade after the test.

As we move up the Taxonomy, though, we come to higher levels of learning. When we require students to interact with each other on these higher levels–*application*, *analysis*, *synthesis*, and *evaluation*–their interactions will be more durable in the long run. In pointing to the need for online discussions to operate on these higher levels, I am in no way saying that knowledge and comprehension are unnecessary. Clearly, students must know and comprehend information. I am suggesting, though, that knowledge and comprehension do not, by themselves, constitute the types of critical thinking that should be indicative of college courses.

Knowledge Construction

The argument that knowledge can be constructed is based on the notion that truth does not exist apart from our perception of that truth. Thankfully, epistemology and ontology are beyond the scope of this paper. But even those who argue the existence of an objective truth must admit that such truth can only be subjectively known. As fallible human beings, we can't possibly claim to have access to the full span of universal truths. Therefore, to learn truth, individual students must construct it for themselves (Tam, 2000). That is, students "create a personal view of the world" (Jonassen, Davidson, Collins, Campbell, & Haag, 1995, p. 11); that personal view becomes the constructed knowledge of students.

Knowledge construction is best accomplished through collaboration. In general, students learn through the give-and-take among classmates. That is, as students write contributions to discussions, they learn what it is that they are trying to say. The replies that they receive from their classmates further this learning. (For a discussion of writing to learn, see Lindemann, 1995.) When students share ideas in a discussion, they receive feedback on those ideas. Often this feedback from classmates will cause cognitive dissonance for the student because it conflicts with their original views. The dissonance

encourages students to revise their views and test their revised views in light of further peer review among the class (Knowlton, Knowlton, & Davis, 2000).

Designing Online Discussions

While the emphasis of this paper is on the teaching and evaluation of online discussions, I would be remiss to ignore the design of online discussions. To some extent, the separation of design, facilitation, and evaluation is artificial. As you will see in the next section of this paper, for example, to use sound principles of online pedagogy is to, in effect, redesign the scope of the discussion. As you will see in the final section of this paper, evaluation of students must be considered in the design process because they need to know up front how they will be evaluated. So, several issues related to "design" are discussed in future sections of this paper. Still, a word about the design qua precursor to discussion is appropriate.

When designing online discussions, instructors must ask themselves a number of relevant questions. Each question is based on the assumption that a goal of online discussion is to promote durable knowledge construction: Will the students respond to specific questions, or will students have maximum freedom to comment on the aspects of a topic that interest them the most? How can questions best be designed to promote durable knowledge construction among students? What amount of total course time should students spend engaging in discussion? How many different questions should be asked throughout a course?

At this point in the article, I wish that I could offer you hard and fast rules for answering these questions. To do so would be naive, though. The context in which the online discussion occurs will influence the answers to many of these questions. (And, in fact, the context in which online discussions occur will effect the questions themselves.) For example, is the online discussion a supplement to face-to-face classroom discussion or is it a part of an online course? Is the class size small enough to require students to reply to each classmate, or is the class extremely large? The possibilities of various contexts are endless. Thus, rules are impractical. Nevertheless, I address specific elements that should be specified within a discussion question, and I address the type of questions that should be designed.

Specified Elements within a Discussion Question

To some extent, specifying elements that should be evident within a discussion is to specify criteria for evaluation. Criteria for evaluation will be addressed more specifically in the last section of this paper. But, in this section commonalties among questions can be suggested. Sometimes, for example, an individual question may need to deviate from the criteria that governs the scope of discussions during a semester. For example, your general criteria for evaluation may require a minimum of four contributions to a discussion in a given week, but perhaps you realize that a specific question is worthy of more attention than others. So, you may need to designate a new minimum number of contributions for that week. In effect, you may need to over-ride the criteria that governs evaluation.

More substantively, I am an advocate of helping students see the intended level of Bloom's Taxonomy within specific questions. I urge instructors who are designing questions to use the words "apply," "analyze," "synthesize," and "evaluate" in the actual question. If students know that you are framing online discussions with a use of Bloom's Taxonomy, they are more likely to write productive answers to questions if they can tell which level of the taxonomy that their contributions to a discussion should address.

Questions that Promote Durable Knowledge Construction

I have used online discussion for the past eight years. Sometimes, I avoided using specific questions in online discussions and simply required students to write about a general area related to a specific course concept or to react to a required course reading. While such an approach has sparked useful discussions among students, I more often find that students resort to summarizing and paraphrasing (which are indicative of the lower levels of Bloom's Taxonomy). Indeed, students are often so well ingrained into the "teacher-as-stimulus/student-as-response" (Knowlton, Knowlton, & Davis, 2000) mode of thinking that they will resort to the safety of regurgitating course content. This type of summarizing, paraphrasing, and regurgitating will not move students to the upper level of Bloom's taxonomy. Thus, learning will not be durable, and no new knowledge will be constructed.

Because online discussion should obligate students to engage in a way that is indicative of the upper level of Bloom's Taxonomy, I advocate writing specific questions for students to respond to. Note, however, that these are not convergent questions with only one correct answer. Instead, these are divergent questions that will offer students plenty of latitude in the way that they answer. Elsewhere, I have categorized these questions as Domains of Thinking, Case Analysis, and Introspective Questions (Knowlton, forthcoming[b]). *Domains of thinking questions* require students to analyze, synthesize, and evaluate the types of problem solving approaches and knowledge construction mechanisms inherent to a given field. For example, in a Biology course, the scientific method is indicative of problem solving within the field. In economics, certain approaches to knowledge construction are more valued than other approaches. Gwartney and Stroup (1995) offer "Eight Guideposts to economic thinking" (p. 7). But, these approaches that are valid in biology and economics are very different from approaches that would be acceptable in a music theory course. Requiring students to overtly acknowledge and interact with the approaches to problem solving and knowledge construction is valid in the context of online discussion.

Case analysis questions require students to apply course theories and concepts to specific, real world scenarios (Hacker & Niederhauser, 2000). For example, in an organizational management course, students might apply a model of a rhetorical situation to explain factors that enhance (and detract from) effective communication in a specific corporate setting. *Introspective questions* are based on issues of metalearning (Brookfield, 1987; Hacker, Dunlosky, & Graesser, 1998) and are designed to force students to examine "how they learn." For example, students could be asked to analyze their contributions to a previous discussion, evaluate the impact of their contributions as

evidenced through classmates' responses, and synthesize guidelines that will help them be more effective in the future discussions.

Facilitating Online Discussion

I've never really been a fan of the word "facilitating." Somehow, this term seems to undermine the professional authority that professors should hold. Nevertheless, I must admit–somewhat begrudgingly–that my dislike of the term is more a function of my own ego than it is a function of sound pedagogy.

Indeed, the word "professor" has at its roots the notion of professing. "Instructor" implies one who instructs students through a step-by-step process that is characterized by mimicking the one who is giving instructions. Both of these titles imply that part of teaching in an online discussion is to offer cyber-lectures. This is problematic, though, because lectures tend to transfer factual information. Lectures, in general, tend to emphasize the importance of the two lowest levels of Bloom's Taxonomy (Anderson, 1998).

I recognize that there are clear exceptions to this rule. For example, a lecture can be offered to students that will give those students sound criteria for evaluating (an upper level of the taxonomy) the design of an advertisement or the quality of a poem. Also, instructors must sometimes clarify factual information so that students use terminology and facts correctly. In spite of these exceptions, online discussion is not an appropriate place for faculty members to profess. Emphasis should be placed on students' construction of knowledge, not on the instructor's views and perspectives. I offer several models that instructors can use to ensure that they are soundly facilitating online discussions while students construct knowledge. After outlining the steps of each model, I focus on instructors' roles as facilitators. In each case, the instructors' roles are based on the responsibility "to frame" online classrooms (Knowlton, 2000, p. 11).

The Traditional Model

The traditional model requires students to post an original response to the discussion question and then respond to each other. Sometimes this model is very structured with rigid criteria and guidelines, but other times, the traditional model may be used more informally so that students can contribute as they see fit without worrying about a bad grade.

As instructors engage in facilitating online discussions in the traditional model, they must consider strategies for deepening students' engagement with course material. Elsewhere (Knowlton, forthcoming[b]), I offer a number of strategies for facilitation that are appropriate in a traditional model discussion. Instructors should (a) explain the theoretical purposes of online discussion, (b) create a sense of community among participants in an online discussion, (c) model appropriate participation, (d) paraphrase students contributions in light of course theory, (e) synthesize students' contributions to create a comprehensive view of the discussion, and (f) use Socratic questioning (Knowlton, forthcoming[b]).

"To frame" (Knowlton, 2000, p. 11) is based on the notion of the instructor responding to students' initiatives, so within a single discussion each of the above strategies may not be necessary, or even advisable. But instructors should broaden their pedagogical repertoire so that they can appropriately facilitate the knowledge construction dance.

The Discussant Model

The discussant model is based on the view that students should play various roles within a discussion (Morrison & Guenther, 2000). This model contains four phases. These phases are summarized in Table 1.

Table 1. Phases of the Discussant Model	
Phase #1:	Instructors designate student discussant(s).
Phase #2:	All students (except the discussants) contribute original answers to a discussion question.
Phase #3:	Discussants react to the original answers provided by students and facilitate additional discussion among the class.
Phase #4:	Students respond to the discussant and respond to each other in light of the discussants' reactions and interpretations.
Phase #5:	All students write a summary of the discussion

One role of an instructor in this model is to train the discussant. Particularly when online discussion is used with undergraduates, instructors can't assume that a student is prepared for the rigors of being a discussant. So, I recommend the use of a "job aid" that might help discussants understand their role and function. The job aid could simply list strategies for facilitating online discussions. More specific job aids, though, could offer suggestions for words and phrases that will help discussants avoid ad hominem attacks.

Another way to train the discussant is through side coaching. Many discussion boards will allow instructors to send messages to individuals that the entire group will not be able to see. I suggest using this function to point out salient themes or contradictions. Especially when students are serving as discussants for the first time, they will appreciate the assistance. More importantly, in this side coaching, instructors can help students understand the rationale of why those themes are worthy of comment. Side coaching can be used with more than just the discussant. It also can help students appropriately respond to the discussant's inquiries and points.

The Self-Analysis Model

The self-analysis model is a variation of the traditional model. But in the self-analysis model, students are required to metacognitively examine their own contributions to a discussion. This model is based on Brookfield's (1987) view that critical thinking is a combination of identifying assumptions in one's own thinking and visualizing alternatives based on those assumptions. The phases of this model are represented in table 2.

Table 2. Phases of the Self-Analysis Model	
Phase #1:	Students contribute original answers to a discussion question.
Phase #2:	Students offer replies to each other as a means of broadening the discussion's scope.
Phase #3:	Students write a summary of the discussion content.
Phase #4:	Students write a self-analysis of their role in the discussion.

Phase four has two purposes. First, students should write a self-analysis of their own assumptions that are inherent to their discussion contributions. What a student didn't say–assumed to be true–can sometimes be just as revealing as what a student did say. So, students should recognize and elaborate on their tacit assumptions. Second, the self-analysis should examine their own propensities as learners. For example, students might be encouraged to elaborate on their own emotional reactions as the discussion developed. The student might also be encouraged to offer and defend reactions about the usefulness (or application) of the discussion. This type of metacognitive activity can help the students learn about their own learning. Therefore, in future discussions, they have a chance to learn more efficiently.

The instructor's role in this model is to help students come to terms with their implicit assumptions and to help students develop a plan of action for bringing the rationality of those assumptions to light. For example, after phase two of the discussion, instructors can use side coaching to point out to students hidden assumptions. Instructors can also ask students to address in the self-analysis a particularly poignant (or particularly ineffective) comment that the student made during phase one or two of the discussion.

Evaluating Students' Contributions to Online Discussions

Many problems are inherent to evaluating students' work in general (Anderson, 1998; Speck, 1998; Knowlton & Knowlton, forthcoming) and online discussions specifically (Bauer & Anderson, 2000). For example, sometimes instructors wait until the end of a discussion to evaluate students' contributions. In waiting, instructors are not distinguishing between "assessing," "grading," and "providing feedback."

Even when instructors do provide feedback, they confuse students because they aren't clear in what they are evaluating. Instructors may evaluate whether students "vigorously

participated" or "substantively engaged themselves." This lack of clarity is problematic because it assumes instructor's understand "vigor," "substance," and "engagement" the same way that students understand these same terms. Indeed, when instructors don't meticulously delineate guidelines and criteria for discussion, students have no choice but to depend on their past experiences to determine the amount and type of participation in which they should engage (Knowlton, Knowlton, & Davis, 2000).

A related problem arises when instructors view themselves as the sole evaluator of students. On the one hand, instructors are the facilitators and counselors of student learning as described in the previous section of this paper. On the other hand, though, instructors must play the role of judge a jury by deciding the students' fate–usually expressed as a grade. I question the ethical implications of an instructor playing both roles. I also assert that students are tacitly aware of this contradiction, and it leads them to be distrustful of both an instructor's advice as a facilitator of knowledge construction and an instructor's evaluation of students' work as a jury and judge. The good news is that instructors can overcome these problems by meticulously delineating criteria for evaluation and broadening the powers of evaluation through self-evaluation and peer evaluation.

Delineating Evaluation Criteria

Establishing criteria is, to some extent, idiosyncratic to an instructor's approach. It may be further idiosyncratic to a particular discipline. The types of online discussion expected in a theology course, for example, may be markedly different from the types of discussion needed in a engineering course. That is, the domains of thinking in a given field will influence evaluation criteria. So, part of establishing criteria requires instructors to ask themselves about the nature of dialogue that occurs in their own discourse communities.

Establishing criteria is not only idiosyncratic to instructors and disciplines, but also it is idiosyncratic to particular classes. As instructors get to know the goals, interests, strengths, and weaknesses of a particular group of students, they may find it necessary to change and adapt criteria. I also advocate opening the door to discussions with students about re-negotiating criteria (Knowlton, 2000). My experiences indicate that students–by virtue of being the ones participating in discussion–often have stronger insights into what aspects of the discussion should be evaluated than I have as an observer and facilitator of the discussion.

In spite of the idiosyncrasies of establishing criteria, I advocate some criteria as being standard when establishing the guidelines of a discussion. Bauer and Anderson (2000) suggest three separate rubrics for evaluating students' contributions to discussions. The first rubric deals with content, the second with expression, and the third with participation. Such an approach may be useful, but I question the value of three separate rubrics. Students are often overly concerned with a grade–as opposed to learning–and they will spend large amounts of time trying to make sense of these three different layers of analysis. I also question the value of over-analyzing expression (mechanics of writing). Online discussions are not revised, formalized pieces of writing; they are essentially

rough drafts. By over-analyzing mechanics, I am concerned that students will stop focusing on constructing knowledge and start focusing on eliminating comma splices.

Sometimes, the guidelines for discussion are very open-ended. They include items that require a large amount of interpretation on the part of instructors and students. For example, participation in discussions might be evaluated based on whether or not a student

- uses vocabulary and terminology indicative of the particular field of study.
- addresses salient theories of the field in a way that is indicative of the types of inquiry commonly accepted within a field.
- organizes and evaluates data, themes, theories, ideas, and perspectives in a productive way.
- uses clear, concise communication and grammar.
- interacts with classmates.
- shows integrity, timeliness, flexibility, and helpfulness as indicators of collegiality.

My experiences suggest that these types of criteria may be valuable for students who understand the implications of each criterion and have experience communicating in academic contexts; but for students who are novices in academic discourse, such loose criteria will be disconcerting.

In most discussions, I phrase the criteria as questions that students can answer about their own work. I also separate the criteria for a strong initial contribution from the criteria for a strong reply. I evaluate initial contributions to a discussion based on the following criteria:

- Is the contribution mechanically clear enough for readers to understand the points being made?
- Is the contribution on time?
- Does the contribution meet the minimum length requirements?
- Does the contribution reference assigned readings or other resources?
- Does the post contain "critical thinking" that is indicative of the paradigms in the field?
- Are the ideas communicated with respect for those who may dissent?

Of these criteria, the issue of length deserves explanation. I usually require students' original posts to be roughly two pages long. I assure students that I'm not a "line counter"; and since some e-mail software and conferencing tools don't show page breaks, I acknowledge that determining length requires some guess-work. Still, giving a

minimum length is important because it takes some length to construct perspectives that can become the basis of knowledge. "Writing to learn" requires engagement. Engagement takes time and effort. The minimum length requirement assures that students are spending the time to become engaged.

For replies, I use the following criteria to determine quality:

- Is the reply mechanically clear enough for readers to understand the points?
- Is the reply on time?
- Are the minimum number of replies written?
- Does the tone of the reply demonstrate respect towards the author of the original post?
- Does the reply inspire further discussion among the class?

Broadening the Powers of Evaluation: Self-Evaluation

For the benefits of online discussions to be realized, students must have formal opportunities for self-evaluation. That is, they must practice evaluating their own contributions to an online discussion against a clearly articulated set of criteria. A "yes/no" checklist, for example, can be useful to students as they try to focus on the evaluation criteria and the way their own contributions to a discussion meet those criteria.

To go beyond checklists, students can be asked to write a paragraph demonstrating how they met each criterion in a given discussion. Instructors might even require students to cut and paste excerpts from their contributions as evidence of meeting the evaluation criteria. As students cut and paste, they are reorganizing their own data by creating a database of their contributions. Through the reorganization process, students are thinking about their own thinking (Kuhn, 1999).

Broadening the Powers of Evaluation: Peer Evaluation

Peer evaluations can also be beneficial in online discussions. Informally, the interaction of the discussion is a form of continuous peer evaluation. When students engage in online discussion, they are receiving feedback on the quality of their ideas. Responses from classmates, for example, can help a student understand how readers interpreted a contribution to a discussion. This informal feedback is what leads students to revise and restate their ideas.

More formally, instructors can create "feedback groups" or peer-review partners. Within these groups, students complete Likert-scale questionnaires or dichotomous checklists that are designed to provide classmates with feedback. Instructors might also ask students to nominate two or three classmates who have made meaningful contributions to a particular discussion. Such nominations emphasize to students that their opinions matter. These types of nominations also place evaluation from the readers of the discussion–

students–in a place of higher prominence than evaluation from the formal authority in a classroom–the instructor. A simple post from the instructor can go a long way toward helping students see the importance of participating rigorously: "Congratulations to Cindy and Keshia. You rewarded them with praises for their contributions last week."

Summary and Conclusion

Durable knowledge construction through online discussion is not happenstance. As instructors consider using online discussion, they should explore the theoretical basis for using online discussion. They should not simply use online discussion because the technology is available.

My experiences have shown me–and theory seems to support my experiences–that when an instructor considers the theoretical rationale for online discussion and designs, facilitates, and evaluates students with that rationale in mind, the educational benefits of online discussion can be substantial. Through these considerations of the instructor, students have opportunities to construct knowledge that will benefit them in their future endeavors.

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Building community in an online learning environment: communication, cooperation and collaboration

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Abstract:

This paper presents strategies and rationales for implementing certain instructional techniques to move a class from cohort to community. The context is the new Distance Master's program in Instructional Systems Technology at Indiana University. The authors give suggestions for instructional and non-instructional strategies that have students interacting at the levels of communication, cooperation and collaboration. These strategies are cross-indicated with their intended outcomes, that is, strengthening the feeling of community as defined by a set of characteristics, which are adapted from Schwier (in press). Suggestions for evaluation techniques are also presented, as are questions for further research.

This paper came out of work done by the team of Tiffany Anderson, Joni Craner, Pam Eddy, Melanie Misanchuk, and Carol L. Smith.

Introduction

The shift from traditional classroom education to computer-mediated distance learning poses enormous challenges to instructors and learners. The concept of the classroom where students meet to interact with other learners and the instructor no longer exists in

the virtual model. The instructor can no longer "look" around the room to see if students are attending to the material, are bored or confused, or are even present. Since learners are now engaged with the computer instead of other learners, they lack a natural social outlet which can lead to feelings of isolation. Because isolation is a major contributor to attrition (Morgan & Tam, 1999), one potential strategy for reducing dropout rates is encouraging the students to support each other and feel part of a community. The task of the authors of this paper was to structure the course design so learners have mechanisms to connect with each other and form community.

The literature on effective teaching and learning promotes several "big ideas" that we used as foundations for our recommendations. These include Vygotsky's (1978) social development theory and the Seven Principles for Good Practice in Undergraduate Education (Chickering & Gamson, 1987). Vygotsky's social development theory states that social interaction is vital to cognitive development; all higher-order functions originate as the relationships among individuals. To scaffold learning we must require learners to interact with the content, the teacher and each other. Our strategies focus on promoting communication, social interaction and participation. Many of the principles, theories and strategies we encountered reflect the Seven Principles of Good Practice in Undergraduate education (Chickering & Gamson, 1987). At their core, each of the seven principles focuses on interaction. In 1996, Moore and Kearsley described three types of interactions that are necessary in distance education: learner to learner, leaner to content and learner to instructor. We would argue that these three types of interaction are necessary in education regardless of where or how it takes place.

Characteristics of Community

There is much discussion of learning communities (Baker & Moss, 1996; Bauman, 1997; Cross, 1998; Haythornthwaite, 1998; Hill & Raven, 2000; Kowch & Schwier, 1997; Palloff & Pratt, 1999; Rasmussen & Skinner, 1997; Raymond, 1999; Riel, 1998; Schwier, 1999; Wilson & Ryder, 1996) of communities of practices (Lave, 1993; Lave & Wenger, 1991; Wenger, 1998), and virtual or online (social) communities (Kim, 2000; Preece, 2000; Wellman, 1979; Wellman, 1999; Wellman, Carrington, & Hall, 1988; Wellman & Guila, 1999a; Wellman & Guila, 1999b). Although each type of community has its distinct characteristics and requirements, there are many things they share in common. What we are endeavoring to create will be a combination of all of the aforementioned communities: a bounded group of students involved in cooperative learning online. Because of special characteristics of this program, some general concerns for community-building do not apply. For example, there is much talk in the virtual community literature about attracting members and defining the community based on common interests. In our case, this cohort is thrown together and "forced" to form community. Outside members are not encouraged to participate, mainly because the common interest in this case is "taking the Distance Master's in IST from IUB." In a terrestrial community of practice, members might see each other at work, or meet in person once a week to deal with issues in their work lives. This will not exactly be the case for our community; although they will probably have some work issues in common, they are not a group of "teachers" or

"nurses" or "engineers" who share vast amounts of experience and knowledge. Unlike an informal learning community, which spins itself from nothing and is based on a variety of people coming together for informal learning purposes and where the direction of both the learning and the community is malleable, our learning community will exist within strict parameters of this coursework. Obviously, members will be encouraged to bring other experiences and knowledge to bear on their coursework, but at the end of the day, the learning in question will be much more restricted than an informal learning community.

Selznik (1996) identifies seven elements of community: *history, identity, mutuality, plurality, autonomy, participation*, and *integration*. With respect to virtual learning communities, Schwier (in press) adds: an *orientation to the future, technology*, and *learning*. Some of these characteristics of community will be present from the beginning. Others, the cohort will have to grow into. We will describe the features of these 10 characteristics, and discuss how we will use them for our purposes. Selznik notes that communities are stronger when their members share history and culture, rather than simply abstract general interests. Unlike an established terrestrial community, the nascent community forming from the Distance Master's program will not have a *shared history*. Their history, like their *identity*, will have to grow and develop through their interactions with each other. We believe that a shared sense of identity will develop in this cohort, and will strengthen their communal identity. Schwier's suggested strategies for fostering identity include team-building exercises, developing community logos, and public acknowledgement of individual and group accomplishments within the community. He also notes the importance of articulating the "focus or purpose of the community" and outlining the requirements and rituals. The structure of the courses allows for frequent and obvious reiteration of community focus, and events such as orientation can help the group define its own rituals and norms.

The very fundamentals of a learning community require interdependence and reciprocity, what Selznik terms *mutuality*. Since our focus is on cooperative and collaborative learning, this mutuality will develop naturally. Schwier also recommends asking "leading questions that encourage members of the community to invest in concerns held by other members, and to share ideas and possible solutions" (p. 5). This type of interaction can be encouraged at course-level in the class forum, and on a social level in the Online Café. We combined Selznik's terms *history, mutuality*, and *identity* into a larger category called *group identity*. By combining these three concepts we emphasize the fundamental importance of group identity in fostering community. Although one of our goals in the next few semesters is to help students begin to construct a history relevant to their community, this is not something that can be imposed upon the group from outside. It has to grow from the sharing of each individual's history and the links that the learners form with each other based on their experiences. These links are characterized by interdependence and reciprocity, in other words, mutuality. Group identity results from this history and mutuality, and from making the budding community history public and available to all, especially newcomers.

Plurality, according to Selznik, results when many different types of interactions amongst members of a community occur, often rooted by individuals' membership in other communities (work, neighborhood, church, etc.) that intersect. We replaced *plurality* with *social interaction*. Given a virtual community, one that to some extent is externally imposed, the opportunities for plurality are limited compared to those available to geographic communities. By providing opportunity for and the expectation of social interaction among participants, we purport the program will provide the plurality needed. *Autonomy* of individual members within the community, especially within an academic setting, is important to foster. We will encourage thoughtful, personal postings within the forum, to avoid group-think and "me too, I agree" contributions. Students will receive basic instruction on netiquette and will be encouraged to continually address evolving group norms to maintain respectful communication and to build consensus. We use *individual identity* in place of *autonomy* to underscore the importance of both group and individual identities within a virtual learning environment.

In the case of a virtual community, *participation*, both social and academic, is integral. Without active participation in discussions and other class activities, the learner is not part of the community; indeed, the learner does not even "exist." This is one core distinction between being a passive member of a physical community where you are seen and your presence is noted and registered in the minds of others. In a virtual community, you must make a concerted effort to communicate with others in order to exist. At the same time, allowances must be made for learners to shape the participation, both in structure (number/kind of postings) and in content (managing the discussion of subjects interesting to them).

The *future orientation* of a learning community can operate at a number of different levels. A stronger community bond will be formed when a particular cohort goes through a number of courses together, moving toward their finishing the program and earning a degree. It can be argued that a learning community can develop within the constraints of a single four-month course, but it is much more likely that students will form long-lasting academic and social bonds throughout an entire program. Visioning exercises and direction of learning activities (having participants describe how what they learned will help them in future learning and in their work) can also give the community a focus on the future. In our case, the community's view of the future may be limited to the two or three years they spend in the program. However, it is possible that they will continue to maintain community ties once they have earned their degrees and are working again. It is also possible that members of the Fall 2000 community would end up wanting to remain part of the Distance Master's community after they graduate, and would like to integrate themselves with the new incoming cohorts. This may pose particular problems of negotiation and fit of the role for graduated members to "return" virtually and engage with students working through the program.

Schwier notes that "the *nature of the learning* can be broadly defined and contextual"(p. 4) but is a necessary part of a virtual learning community. For our purposes, the learning involved is more specific and structured; the cohort moves through a set of core courses together, in a particular order. Our goal is to foster community among them before they

finish the first year, so that although they will go on to take other courses with other distance learners, they will not only maintain ties with their initial cohort community, but will also have learned the foundations of virtual community creation and will use these skills in other classes. We have changed Schwier's term *learning* to *knowledge generation*. According to Schwier, "communities are built or dismantled by those in the communities, not by the people organizing or managing them" (p. 2). As they mature, communities define their own social rules of conduct and select their own leaders, assuming *ownership* of their governance and norms. Learning communities, note Palloff and Pratt (1999), exhibit evidence of socially constructed meaning, willingness to critically evaluate the work of others, again assuming ownership of their knowledge creation and sharing.

Integration of all of these elements is necessary for a strong community. Schwier suggests creating belief statements and evolving group norms, and adhering to a learner-centered philosophy that "supports individual expression while building a group identity" (p. 5). Finally, *technology* is an important consideration for us: although it is thanks to certain technologies that virtual community-building is even possible, there are certain limitations put upon the group because of technology. Although it is the conduit for discourse, it can also exclude or discourage people. Tools that are complicated, unavailable for a certain platform, that are slow and cumbersome can all render the discussion process less than ideal, and members who do not actively participate essentially leave the community. Although Schwier recommends using technology compatible with older, less costly equipment to render the community more inclusive, this is not a concern for us.

Based on Selznik's (1996) seven characteristics and Schwier's (in press) additional three characteristics of community, we have assembled the aforementioned six key elements of community. From these elements, we define community as: a group of people who are brought together to share and generate knowledge in a mutually supportive and reciprocal manner. Its characteristics are ownership, social interaction, group identity, individual identity, participation, and knowledge generation. Furthermore, integration of all of these elements is necessary for a strong community.

Having defined some of the particular characteristics of a virtual community, we will now turn to some basic strategies for creating community. Palloff and Pratt (1999) recommend these steps:

- Clearly define the purpose of the group
- Create a distinctive gathering place for the group
- Promote effective leadership from within.
- Define norms and a clear code of conduct.
- Allow for a range of member roles.
- Allow for and facilitate subgroups.
- Allow members to resolve their own disputes (p. 24)

In our case, many of these steps are automatic, but they should still be given careful consideration. For example, the general purpose of the community is defined as "the Fall 2000 cohort for the IST Distance Master's program." However, instructors or organizers may have more specific goals and purposes from the beginning, and even if they do not, other purposes may emerge from the community throughout the term. Pallof and Pratt (1999), surprisingly, do not put much emphasis on the communicative aspect of community without which a virtual learning community cannot exist.

We feel that one of the most important indicators of a learning community is the first: when students communicate not only on an academic level but on a personal level. Working together towards the goals of the course is what they are "supposed" to be doing. When they begin to talk about their personal lives (families, hobbies, jobs), their triumphs and trials with being a distance student (scheduling, technical problems, disagreement with pedagogy), when they seek each other's counsel for other areas of their life (job change, which elective course to take next, family issues), this is the point at which we feel they are comfortable as a community. There is a good chance that not everyone will be everyone else's best friend. However, when a majority of the members feel they are in a safe enough space to "speak up" about things in the public forum, rather than in individual e-mail messages, then this is evidence of a successful community. There may be a few members of the community who do not feel that the Online Café is an appropriate place to discuss non-academic subjects, and it is the role of the mentor and the community members to make the Café a welcoming place for this type of discussion. As in every type of community, there will be some people who opt out of certain discussions, or even out of all "non-official" discussion, but this is quite normal. There will probably be smaller communities within the larger online class, people who form bonds and discuss the course work and their lives, but not on the general forum. These differences can appear for a variety of reasons; Eastmond (1995) found divisions on age, gender, experience, and learning style lines. However, he also found that the groups often transcended age and gender, for example, two characteristics that might, in a traditional classroom, be impediments. The final step in creation of an online community is to evaluate whether a community has formed, and if so, in what ways has the community aspect contributed to learning. Our project will address methods for performing the first evaluation of whether community has formed.

Definitions

We will examine ways to use certain instructional strategies to work to move the cohort toward a community. We suggest encouraging interaction at three levels: communication, cooperation, and collaboration.

Cohort: The cohort is the group of students going through the core classes as a group. They may have an initial connection, such as a common employer, but it does not necessarily constitute a strong bond.

Communication: Communication is defined here as the basic level of discussion in an online format. Students must participate in discussion to have any sort of presence in the class whatsoever. Communication can be focused around readings, lectures, and any other ideas based on course content or course administration. Communication can occur asynchronously in the SSF or via e-mail, or synchronously via chat rooms or telephone.

Cooperation: Cooperation entails students working in groups or otherwise dividing up tasks. A machine metaphor can illustrate cooperation in the classroom: different parts of the machine perform different functions and goals, but work together towards a similar end. For example, students may divide up a project, but are eventually assigned individual grades for their work. Examples of cooperative tasks include: dividing up sections of a report to write and doing peer review of each other's work.

Collaboration: Collaboration is the most integrated form of group work, and is therefore potentially the most difficult and the most rewarding. In the case of collaboration, the group members work toward a common goal, one that carries a mutual investment. For example, students may each work on every part of the report, consulting each other and re-reading each other's edits. They are invested in every part of the project because they will share a common grade. Examples of collaborative tasks include group writing and creating an instructional design model.

Community: A virtual learning community, as described in the introduction, is one of the ultimate goals of the core courses.

The three levels of interactions can be compared by several characteristics, as in the table below.

	Communication	**Cooperation**	**Collaboration**
Learning	Information transmission	Knowledge transmission	Knowledge generation
Inquiry	Individual inquiry	Delegation of tasks	Common inquiry
Decision-making	Agree to disagree	Vote (majority rules)	Social negotiation to consensus
Goals/agendas	Multiple goals/ multiple agendas	One goal/ multiple agendas	One goal/ one agenda
Accountability	Individual accountability	Individual accountability	Group accountability
Learning relationship	Complete independence	Partial interdependence	Complete interdependence

As one of our goals is to create and sustain a community of learners, we set about achieving that goal using a variety of resources. Our two main categories of strategies were instructional and non-instructional. Strategies that fall into instructional include: ways of presenting material; assignment design; team management; content covered; strategies for discussing material. Non-instructional strategies include: creating a computer support system so that students look beyond the technology; making reserve readings and other library resources readily available to distance students; designing an onsite orientation that encourages students to quickly "bond" with each other at the beginning of the program; creating an online café for off-topic discussions; dealing with team/class disputes.

Core Instructional Strategies and Rationales

These are strategies that can be used throughout the Core courses, at the program level, and how they contribute to the elements of community.

Ownership	Knowledge Generation	Individ. Identity	Shared Identity	Social Interact.	Particip.	Strategies	Rationale
x		x	x	x	x	Students participate in a face-to-face orientation on campus.	Face-to-face interactions allow to people to create strong initial bonds, which will lead to a greater sense of community right from the beginning.
x	x			x	x	Students will learn about online communication, including rules of netiquette	Online communication is vastly different from more traditional forms of communications (Black, 1995).
	x			x	x	Students will undergo training in using SiteScape Forum, e-mail, majordomo	To help reduce barriers to effective learning and establishing social

						creation, basic web searches, and MS Word for collaborative writing purposes.	relationships, participants should be given the opportunity to build confidence and competence with the distance education process and supporting technologies (IDE, 2.2).
		x	x	x		Students will post photos of in SiteScape Forum at Orientation.	Connecting people's names and faces is a first big step to forming bonds.
x	x		x	x	x	Students will participate in a content-based group project that requires that they negotiate the exact content.	People will form strong personal and academic bonds through shared adversity (Ruhleder, 1999).
			x	x		Students will be required to eat lunch as a group two days during Orientation.	People who have a social connection to the group will work better together (Palloff & Pratt, 1999).
			x	x		Students will be given the opportunity to participate in at least two evening social activities.	People who have a social connection to the group will work better together (Palloff & Pratt, 1999)
		x			x	First posting should be a non-	Students need non-threatening, interesting ways

						graded/non-credited assignment (e.g. biography).	to begin creating online community (Funaro, 1999).
x	x	x	x	x	x	Create an online café that will serve as a non-course-specific conversation area to encourage off-task communication.	People need distinctions between work and play (Palloff & Pratt, 1999).
x			x	x		Encourage instructor and distance mentors to participate in social interactions, especially in the early stages of the course	Social interactions between and among learners enrich the learning community and should be supported in the instructional design of the course (IDE, 2.5).
		x	x	x	x	Students will be encouraged to share, in the online café, information about their non-academic lives, for example, offering mutual support in term of how they are keeping up with their job and school schedule. Students should be encouraged	Reciprocity and help are two important hallmarks of community. Students who take an interest in each other's well being, both academic and social, will have more of a support system of peers than those who do not (Wellman & Gulia, 1999).

						to offer successful strategies to the class.	

R511 Instructional Strategies and Rationales

R511, Instructional Technology Foundations I, is a two-credit course that has historically been offered each fall semester. This course is required by all IST Master's students and is typically taken concurrently with R521/522, Instructional Design and Development, and R580, IST Colloquium. It is team-taught by two faculty members and one graduate assistant who has taken the course. As it actually happened, R511 and R590 were NOT offered to the first cohort of Distance Master's students, so these strategies were not implemented in Fall 2000. However, course design for Fall 2001 is now underway.

The overall objective of R511 is to provide a comprehensive introduction to the field and profession of Instructional Technology (IT). Because most students coming into the IST program come from fields other than instructional technology, R511 gives newcomers a grounding in the history of the field as well as an explanation of how the components of the field fit together. There is a particular emphasis on the evolution of the "big ideas" of IT.

In the onsite version of R511, class meetings occur once per week in 2-hour sessions. Directed readings compiled in a course packet are provided as practical resources to support assignments and class discussion activities in the course. Most class periods are divided into two portions: During the first hour, each of the three instructors facilitates a group discussion among 15-20 students about assigned readings. The remaining portion of the class time is devoted to further lecture and clarification about topics contained in the readings.

Students are graded according to participation in class discussion, personal synthesis and reflection (as noted in weekly minute-papers collected at the end of each class), three individual written essays (one team-based, two individual), and a final exam or written essay.

Ownership	Knowledge Generation	Individ. Identity	Shared Identity	Social Interact.	Particip.	Strategies	Rationale
					x	A fundamental element for success for the distance students is an understanding of the key expectations • how much time	Students, but especially students learning at a distance, need to have expectations,

						the course will require • the level of performance that is expected of them • the demands that participating in the core will have on their time.	assumptions, deadlines, etc., made explicit and kept clear (Palloff & Pratt, 1999). Understanding and respecting expecta-tions for participation and performance will be critical to the students' success. Taking Core online will be more demanding than doing it face-to-face.
	x	x		x	x	Instructors will assign discussion roles (facilitator, summarizer, devil's advocate, etc.) to encourage shy members and force students to think in different ways about the material and about the discussion of the material.	Students should be challenged to engage the material from different perspectives; different roles improve learner-learner interaction and improve learner-material interaction (Bonk, 2000).
	x		x		x	Students will be expected to take part in regular peer reviews by critically evaluating	It is important to develop a critical eye towards other

						each other's papers.	community members' work.
x	x				x	Each week, someone from each group will summarize their group's discussion and post the results for the other groups to read.	Bringing from small groups to the larger group provides for more viewpoints and better discussion (Beaudin, 1999).
	x		x		x	Students will be divided into 3-4 small groups for discussion of readings and course projects.	Small groups facilitate better discussion for learner-material interaction (Hiltz, 1998).
x		x			x	Students will fill out weekly "1-minute evaluation" web form, to instructor only. Possible topics include what you liked/disliked about the week's work, how you can transfer this knowledge to your work, and generally how you are feeling.	To better assimilate and process what they have learned, students require a forum to critically reflect on the material and on themselves as learners (Palloff & Pratt, 1999). Keeping in touch with the professor improves learner-faculty interaction.
	x		x		x	Instructors will require high-quality online	Effective learning

						interactions with peers and discussions of readings by making a portion of the grade dependent on it. (We recommend at least 25%).	environments should provide frequent and meaningful interactions among learners. (IDE, 2.1)Good practice encourages cooperation among students (Chickering & Gamson, 1987).
	x			x	x	Instructor and/or mentor will model ways to produce lively, constructive discussion: questions should be open-ended, but focused on students' interpretation of the text.	One of the best ways to keep discussion on topic and students motivated is to participate actively in the conversation (Beaudin 1999).
x	x	x			x	Instructor will point out excellent discussion, postings, interactions, etc. of other students to continually promote high expectations and model good interaction.	Good practice encourages prompt feedback (Chickering & Gamson, 1987). Faculty-learner interaction improved by attentive professor.
x			x	x		As needed, instructor will revisit netiquette	Social negotiation

						and general interaction issues, and stresses the importance of interacting in a respectful way. Have the community develop group norms based on emergent issues.	leads to the creation of a safe space, which is essential for learning (Palloff & Pratt, 1999).
					x	Students will be expected to check SiteScape Forum and e-mail every two days and post quality contributions at least twice a week. Participation points will be calculated based on these postings.	Because of the nature of the evolving discussion, students should be constantly engaged in the course, without any lengthy absences from discussion. (Caldwell & Taha, 1993)
x		x	x		x	The instructor/AI should make contact with students who are not actively participating to find out why and address their concerns.	Students need to actively feel like they're part of the community, and that the instructor is interested in their well-being, academic or otherwise (Palloff & Pratt, 1999).
	x		x		x	Students will work together at all three levels of interaction: • Communication • Cooperation	In order for a newly-formed cohort to move to community, they must change the

						• Collaboration	quality of their interactions. The community should move toward successful use of collaboration, in addition to the continued use of group discussions and cooperative tasks.

Questions for Further Research

The evaluation of the success or failure of community in the Fall 2000 Distance Master's Core is a question of primary interest. It will be useful to determine whether community forms, and if it does form, what pedagogical advantages does it offer the learners. There are many other topics worthy of research.

- What are some valid measures of community development?
- How can learners be motivated to take part in virtual academic or social community activities?
- What are special features of "forced community" like the Master's cohort?
- What is the expected/observed life cycle of the Distance Master's learning community?
- How does this community develop and maintain its history?
- Should the Distance community be integrated with the residential graduate community? If so, in both academic and social ways? If so, how can this be accomplished?
- How can the community best be mentored?
- What are the different roles for instructors, graduate assistants, volunteers, upper-year IST students, etc?
- What communication/collaboration tools foster the development of a learning community?
- What are the best practices for using existing communication tools in distance education?
- What tool features lend themselves to different aspects of collaboration and community-building?
- How appropriate were the tools chosen for Fall 2000 in terms of collaboration and community formation?

Conclusion

Having determined that richer learning takes place within the context of a learning community, this report provides background descriptions of characteristics of community and, more specifically, a virtual learning community. We discuss the goal of moving a cohort to a learning community through scaffolding activities rooted in the communication formats of communication, cooperation, and collaboration.

The report deals with both the program-level: Core (principally orientation and the online café), and course-level: R511. The courses are described, instructional strategies and rationales are presented, possible assignments are detailed, and an instructor checklist is provided.
Finally we thought it necessary to determine some strategies to evaluate a) whether community has formed within the cohort, and b) in what ways the community contributed to deeper learning. We also provide some possible topics for further study.

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For a more complete listing of ebook publishers, go to http://www.ebookconnections.com/epublisher.htm ebookconnections.com. For more detailed information about sites that publish originial ebooks, see the article "Tomorrow's Publishers Today" by Jim Milliot, Calvin Reid, Steven M. Zeitchik in Publishers Weekly 247 no10 42, 44 Mr 6 2000.

Paraphrasing Keith Devlin, dean of science at St. Mary's College of California--quoted in the Washington Post, April 25. We may be moving toward a generation that is cognitively unable to acquire information efficiently by reading a paragraph. They can

read words and sentences--such as bit of text you find on a graphical display on a Web page--but they are not equipped to assimilate structured information that requires a paragraph to get across.....it is not surprising that the medium for acquiring information that college students find most natural is visual nonverbal: pictures, video, illustrations and diagrams. ... The shift from printed text to digitized text is affecting libraries in many ways, and it is difficult to predict just where these changes are leading or what the final impact will be on the future of the book and the library. Many academic libraries have chosen NetLibrary to begin this journey.

Middle Tennessee State University Library offers a shared collection of electronic books (eBooks) to its faculty, staff, and students using netLibrary, a distributor of eBooks through the internet. MTSU participates in the netLibrary Shared Collection program administered by the Southeastern Library Network (SOLINET) which includes 10,690 volumes in its Library Collection. Also available free of charge is a large Public Collection of 4000 public domain eBooks. Libraries belonging to this program share access to all of the available titles. SOLINET maintains ownership of the electronic books in the shared collection in perpetuity. Academic libraries pay SOLINET an access fee based upon their full time equivalent (FTE) enrollment. A reserve account is earmarked for purchasing multiple copies of titles accessed frequently.

SOLINET's shared collection includes titles representing all academic subject areas. Of special note is the inclusion of 400 *CHOICE* magazine Outstanding Academic Titles, a large number of current imprints from 1998-2000, 1300 science, technology, and computer science titles including all O'Reilly titles, and books popular at both public and academic libraries such as the Complete Idiot Guides, Cliff Notes, and various career and travel guides. Libraries also have the option to purchase and develop individual eBook collections from netLibrary available only to their own library users. Libraries can operate both shared and owned netLibrary collections simultaneously.

netLibrary's eBooks can be accessed 24 hours a day, 7 days a week. Library users accessing netLibrary from in-house authenticated computers can search and browse the collection without logging in to netLibrary. Once an account has been created from an authenticated computer, the user can login to netLibrary and read eBooks from any PC anywhere.

Libraries can make their eBook collections searchable through their web-based online catalogs with a direct link to the desired title at netLibrary and/or create a link to netLibrary on their homepage. If using netLibrary's search features the collection can be easily searched using the Search for eBooks form as well as from the Quick Search, Power Search, and Command Search options. Depending upon which option is selected the collection can be searched by keyword, full text, author, subject, publisher, publication year, ISBN, and using the Boolean operators an, or, not. Quotations can be used to search phrases.

Search results are displayed in order of relevancy unless otherwise indicated in the Power Search and Command Search options. A maximum of 300 search results are returned.

The brief record display is the default. A long record display with linked subject headings can also be selected from the Power Search option.

Library users can browse titles for up to 15 minutes without checking them out or logging in. However, library users must login in order to check out eBooks for the shared collection's 2-hour checkout period. Individually owned library collections can set heir own check out periods. Only one person can browse or have any given copy checked out at any given time.

Once a title has been checked out library users have the option of either reading the book online through their live internet connection or to download the book to their computer's hard disk. The My eBooks option allows users to manage titles placed on their eBookshelf and to edit their account information. Online reading is accomplished using netLibrary's browser-based online eBook Reader. A feature packed tool palette allows users to click on tabs to search an eBook for a word or phrase, consult the 4th edition of the *American Heritage Dictionary* for word definitions with audio pronunciations, to display the book's table of contents with chapter links, and to consult online help. Offline reading is accomplished through netLibrary's free eBook Reader software that can be downloaded along with the book title. The eBook Reader allows users to search text for words or phrases, create annotation sets of bookmarked sections, highlighted text, and margin notes, copy/paste restricted amounts of text into other documents complete with quotations and a MLA citation, print restricted amounts of text, and zoom to enlarge or shrink text size.

Books are automatically returned at the end of the 2-hour checkout. Popup warnings are providing near the end of the check out period. If the book is not reserved for someone else it may be checked out again. When a downloaded copy of a book is returned only the eBook Reader is disabled. A user can either maintain a copy of the downloaded copy of the eBook on his/her hard disk or delete it. If kept, when the book is checked out again netLibrary will recognize that a downloaded copy is already available and will reactivate the eBook Reader and any saved annotation sets.

Copyright is protected automatically through the one copy, one checkout policy. Viewing and printing is restricted to only about 5000 characters or one page at a time. Popup copyright warnings appear when users try to print or copy too much text. Repeated attempts to abuse copyright result in the user's account being reset.

Account management is accomplished through the password protected Library Extranet. The library's account administrator can quickly and easily obtain MTSU eBook usage and collection development reports.

netLibrary's recent business acquisitions show the company expanding their focus to include offering electronic textbooks, marketing individual titles directly to consumers, printing books on demand, and printing short run titles on demand.

Offering netLibrary has been an excellent way for MTSU Library to introduce computer savvy students, faculty and staff to the convenience of electronic books without the need to acquire and manage the use of expensive hand held readers. Integrating electronic books into an academic library collection is not without problems and concerns. The nature of the ebook has raised issues regarding circulation, readability, and bibliographic control.

In the academic library environment, there is a propensity of reference books and technical books, both of which are well-suited for the electronic format, a fact pointed out by Jack O'Gorman in a recent review of netLibrary (O'Gorman, 2001). Electronic books are a convenient format for reference tools - a patron can search the scope of a book, access the content to get pertinent information, and return the book. O'Gorman points to the success of *The Oxford English Dictionary* and *Encyclopaedia Britannica* in electronic formats as evidence of this. Technical books are especially well-suited for the electronic format because they become outdated quickly and are hard to keep in the library because of high demand. The online version of Elsevier Science's *New Encyclopedia of Industrial Chemistry* slated for released in September 2001 will feature hyperlinked indexes, cross references, and bibliographic links to abstracts and full texts where available (Wilkinson, 2000). Industry experts predict that electronic versions will grow to dominate the book industry, due to the increasing array of features unavailable in print and the increased flexibility in updating multi-volume reference works.

The advantages of electronic books are significant - rapid delivery to patrons, elimination of printing and distribution costs, reduced "processing" before they go into circulation, and easy replacement if lost or damaged. Furthermore, concerns about missing pages or highlighting within the text by other patrons are eliminated; storage space is minimal, and type can easily be enlarged. Already, there is a certain amount of versatility in this format. E-books can be downloaded from booksellers to be read from desktop or laptop computers, or there are battery powered readers - handheld devices designed for storing and reading e-books. In spite of the advantages, however, the

e-book format is not quite the perfect medium. Let us look briefly at some of the problems encountered by academic libraries with electronic books.

Circulation Problems

Many academic libraries have encountered problems in circulating electronic books. Jack O'Gorman's review of netLibrary, pointed out some limitations that may not represent the best interests of the patron. First, the checkout status is dependent upon the library's access to the vendor. In other words, a library may have only one user per book at a time, unless the library has purchased multiple copies of a title.

Additional problems have been encountered with (usually brief) checkout times. Circulation periods for e-books range from a few hours to as long as two weeks. If a patron is unable to finish a book within the allotted time period, he would have to return the book and check it out again, hoping that it was still available. Coupled with the (often

considerable) download time, this could make an e-book far less attractive than a traditional book.

Finally, several libraries have reported logistical problems in circulating e-readers.

Most often, libraries have had to provide some sort of tote bag that would be large enough to hold the device itself, its accompanying battery pack, and other relevant materials such as instructions, user agreements, etc.

Readability Problems

Effective display of technical and scientific content is an area of concern for producers of e-book readers. Most publishers agree that the current crop of dedicated readers is simply not up to the task. One concern is that the resolution of on-screen displays tend to be significantly lower than that of a printed page. This is particularly problematic in dealing with content that contains color, graphics, extensive diagrams or detailed illustrations. Another drawback is the lack of a standard way of displaying equations and intense tabular material found in scientific documents. This problem will likely be addressed as the e-book industry moves towards standardization of document formats.

Bibliographic Control

One of the advantages of electronic books is that they don't need the extensive "processing" that traditional books need to prepare them for circulation. In academic libraries, however, it is still important to obtain complete bibliographic information in order to catalog the books. Nancy Gibbs, in her report on North Carolina State University's ongoing e-book experiment, addresses this issue (Gibbs, 2000). The library catalog could not be updated with records for electronic books until catalogers had viewed them, because the vendor's listing did not provide sufficient bibliographic data.

Administrative Problems

The electronic book format raises a number of questions regarding copyright, fair use, intellectual property and digital rights. In incorporating e-books into an academic library collection, library staff will face problems related to archiving, network applications, product support and updates, interfaces, and license agreements. In acquiring electronic books, it is necessary to address issues regarding space and equipment requirements, impact on other resources and services, and vendor and technical support. Collection management will inevitably become a far more intricate process.

Conclusion

Most academic libraries have had some degree of success with web based resources and electronic journals. In these instances e-books will integrate easily into the infrastructure.

Advances in high resolution screen technology and improved software display will inevitably improve the readability of electronic books. Emerging generations of

e-book readers will have features which will considerably improve their readability - built-in electronic dictionaries and on screen note-pads, the ability the highlight passages

of text, the option to change the orientation of the display by rotating the screen contents (a useful option for left handed readers). The electronic book format has tremendous possibilities for the distance education arena. As the traditional university becomes the virtual university, scholars will access a virtual library of electronic resources.

Further information on Electronic Books

Electronic Book Evaluation Project

The overall goal of the LSTA-funded **Electronic Book Evaluation Project** is to evaluate the uses and feasibility of electronic books in various types of libraries. Year 1 (October 1999 - September 2000) focused on portable, dedicated electronic book devices, included the Rocket eBook and SoftBook Readers. During Year 2 (October 2000 - September 2001), we are continuing to evaluation ebook technologies, such as audio ebooks and new ebook devices, by placing them in area academic, public and school libraries. In addition, the project members will focus on disseminating the information we have learned and finding means by which to educate the ebook industry about the unique needs of libraries. This project is supported by Federal Library Services and Technology Act funds, awarded to The New York State Library by the Federal Institute of Museum and Library Services.
<http://www.rrlc.org/ebook/ebookhome.html>

Ebooknet

http://www.ebooknet.com/

Can e-book improve libraries?

http://skyways.lib.ks.us/central/ebooks/

North Carolina State University

The Library at NCSU is circulating both the Rocket ebook and the Soft Book to students and faculty.

http://www.lib.ncsu.edu/colmgmt/ebooks/

Open eBook Forum http://www.openebook.org The purpose of the Open eBook Forum (OEBF) is to create and maintain standards and promote the successful adoption of electronic books. The consumer would be able to buy any authorized ebook and read it on any authorized device.

Tumblebooks for kids <http://www.tumblebooks.com/indexwf.html>

Etext Center http://etext.lib.virginia.edu/

1st Books at http://www.1stbooks.com Set up your own ebook library.

Quark http://www.quark.com Working with Microsoft, QuarkXPress will be able to create eBooks and documents for Microsoft Reader with ClearType and QuarkXTensions will enable users to convert content to Microsoft Reader format for multiple devices, including laptops, and PCs, and purpose-built reading devices.

EBX Working Group http://www.ebxwg.org/ The Electronic Book Exchange (EBX) Working Group is an organization of companies and individuals developing a standard for protecting copyright in electronic books and for distributing electronic books among publishers, distributors, retailers, libraries, and consumers. The draft EBX specification accommodates a variety of content formats for electronic books, including Open eBook Publication Structure and Adobe Portable Document Format (PDF).

XFR Experiments in Reading http://www.thetech.org/xfr/xfr-red/xfr_guide.html

Lightning Source http://www.lightningsource.com An alliance with Adobe will soon make eBook titles from Lightning Sources' growing digital library available for purchase and download over the Internet. Publishers and retailers now have new avenues to meet the growing demand for eBooks. Lightning Source, a subsidiary of Ingram is a leader in the print-on-demand industry. The company stores books and other information electronically and delivers them "on demand" in either traditional printed format or as eBooks in response to orders from booksellers, librarians and publishers. Lightning Sources' digital library currently holds more than 9,000 titles and is growing by an average of 250 titles per week. *PR Newswire*, May 31, 2000

e-ink http://www.eink.com/splash.htm This web site illustrates how electric ink will work. Although the technology to extend this to paper is about 10 years in the future, e-ink is now being used in signs and posters.

Electronic paper http://www.parc.xerox.com/dhl/projects/gyricon/ Electronic paper utitlizes a new display technology called "gyricon" and it falls somewhere between paper and a computer screen. Like paper, it is user-friendly, thin, lightweight, and flexible. But like a computer display, it is also dynamic and rewritable. "Xerox PARC and 3M to Collaborate on Electronic Paper" in *Information Today* 16 no8 35+ s 1999.

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COMBINING STUDIO VIDEOCONFERENCING AND THE INTERNET TO PROMOTE INTERCULTURAL UNDERSTANDING

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Abstract: *Projet Mercure*, or the Mercury Project, was a consortium of universities in North America that used videoconferencing to link with university classrooms in France; its purpose was to provide a new approach to teaching French language and civilization. This paper examines one such videoconference between both Austin Peay State University and the University of Tennessee at Martin and the Université d'Orléans that covered the American presidential election process. Areas of discussion include a history of *Projet Mercure*, student and teacher preparations for the conference, technical considerations, a description of what happened during the conference, and an overview of the lessons learned.

"Bonjour, Jeanne."
"Qui est à l'appareil?"

In 1963, this dialog in conversational French, delivered on reel-to-reel tapes, initiated our first experiences in foreign language learning. Prior to this, radio and recordings had been used on a limited basis to deliver the audio experience of a foreign language to beginning students. After 38 years, we are still looking for dialog with our French neighbors, only now *l'appareil* has changed. In fact, it has changed continually during these intervening years. Advances in technology in the last decade have brought significant new communication options to the foreign language classroom. Today our foreign language students send each other email, fax documents, visit each other's web sites to examine position statements, and finally meet each other face-to-face in compressed video classrooms. Long after classroom encounters, students may continue the exchange of ideas via online options and explore personal viewpoints and relationships that put a human face on the culture they study.

Projet Mercure, or the Mercury Project, was a consortium of universities in North America using videoconferencing to create a link with university classrooms in France. The project headquarters were at Oakland University in Michigan, and member

universities included The University of Tennessee at Martin, Austin Peay State University, the University of Windsor, Dowling College, Purdue University, and Northwestern University. In France, the project center was at the Université d'Orléans, with additional universities (Nanterre, Paris III and Bourgogne) participating through the FIED, the Fédération Interuniversitaire de l'Enseignement à Distance.

History of *Projet Mercure*

Projet Mercure initially grew out of a distance learning project begun in 1992 at the Université d'Orléans to provide a new approach to teaching French language and civilization. Orléans designed a course delivered via a combination of on-site immersion and videoconference to adult learners of French at a university in Sweden. As a result of this project, Orléans became the first French university to create its own videoconferencing studio.

Michel Dion, Head of External Relations and Communication for the Université d'Orléans, sought additional ways to apply this new technology. He invited Oakland University in Michigan to participate in a project involving American students enrolled in a business French course and French students of business at Orléans. In the initial videoconference session, students at Oakland interviewed a group of economic development officials at Orléans in French. In the following session, the French students of business interviewed (in English) a group of vice presidents of American corporations.

The following year, a videoconference project on substance abuse was organized between students studying French civilization at Oakland University and the University of Michigan-Dearborn and students enrolled in a class on American Civilization at Orléans. In the first session, the American students made a presentation on the controversial subject, followed by a question-and-answer session, all in English. In the second session, the roles were reversed, with presentations by the students in Orléans in French, followed by questions posed of them by the American students. This model was found to be effective and has continued to serve for subsequent exchanges.

The next year, one of the participants, Paul Crapo, left Dearborn, Michigan to become chair of Modern Foreign Languages at the University of Tennessee at Martin. He anticipated continuing his involvement with the Mercury Project, but upon his arrival in Tennessee, he was dismayed to discover that the project could not be conducted at UT-Martin. While UT-Martin had a modern videoconferencing studio, it was unable to make the dial-up connections required for conferencing with France. Instead, it was limited to network connections to other sites within the University of Tennessee system. Crapo became acquainted with Karen Sorenson, then assistant professor of French at Austin Peay State University, and learned that Austin Peay, located in Clarksville, Tennessee about 100 miles northeast of UT-Martin, had recently installed a videoconferencing classroom that had the dial-up capability required to connect with France. As a result, students and faculty from both universities joined forces with the Université d'Orléans and planned a videoconference series on the subject of presidential elections.

Preparations for the conference

American students needed both content and technical orientation for the videoconference. With regard to content, faculty and students gathered print media and video materials relating to both French and American politics and the presidential election process in each country, creating a database of information. Both French and American participants faxed articles and sent videos overseas to be used by their partner classrooms. To provide all participating students access to a broad range of information on both the French and American elections, Robert Peckham, professor of French at UT-Martin, created a website for *Projet Mercure* (http://fmc.utm.edu/~rpeckham/presi.html). The site contained links to a number of items ranging from the personal political statements of the French and American participants to web sites relating to the political parties, candidates, their platforms, and their reception in the press. Students interested in the French elections could access the official web sites of the French government on the President and presidential elections. Students interested in learning more about the presidential elections in the U.S. could explore the official Republican National Convention site, the Republican Presidential Candidates site, the Democratic Party CG '96 site, Democratic National Committee site, and The White House site. In addition, links connected students to the Reform Party Perot '96 and the Libertarian Party sites.

To prepare their statements, the Austin Peay and UT-Martin students were told to read about and reflect upon the election-year issues that were most important to them as individuals. Students were then asked to focus on one or two of those issues and to construct a one to one-and-a-half page statement that developed their views. The American students were a diverse group: some did not perceive themselves as interested in politics and political issues; some had never voted while others had some experience in politics at the local or state level. One student from UT-Martin had even been a delegate to the Democratic National Convention.

Technical considerations and preparations

Compressed video, the planned medium of the videoconference with France, uses computers and software to digitize and send video and audio signals from one site over telephone lines to computers at other sites. The receiving computers use the same means to collect and display digital video and audio information locally. In this manner, live communications that contain video, audio, and graphic information are exchanged. Most compressed videoconferencing done in the United States is handled via some kind of terrestrial phone lines, either large capacity lines or a number of small capacity lines that are digitally bonded together to carry all the audio and video signals.

The conference room at the Austin Peay site is a traditional classroom made up of four rows of tables that could seat as many as 24 persons. Eight classroom microphones are evenly distributed, two to each row. At the front of the room are two 35" monitors--one displayed the incoming signal from France; the other showed what was being sent to France.

There were two cameras aimed at conference participants. One camera was at the front of the room between the two monitors and showed those seated at the tables. A second

camera was aimed at a teaching station located to one side of the monitors. These were the only two cameras used in the original videoconference. A third overhead camera for displaying documents and a videocassette recorder completed the video options available.

Connectivity testing, to see whether the Austin Peay site could establish a connection with the Université d'Orléans for a compressed videoconference began in the summer of 1996. As the proposed conference to Orléans was overseas, BellSouth technicians had to calibrate the transmission rate of the signals to those in France that ran at a lower speed. They also had to send the signals via satellite as well as over phone lines.

In scheduling the conference, there was a time element to consider. The six-hour time difference made it necessary for the conference to begin no later than 8:30 AM Central Time in the United States so that students and technicians in France were still available at school.

As this exchange was a first for the Austin Peay students, two orientation sessions were undertaken: a planning meeting and overview for Austin Peay faculty and a general orientation and coaching session for the students. At the first meeting we discussed the room set-up and equipment layout, how cameras should be aimed, and where students should sit to maximize the video image. We chose to seat students in a block formation rather than a panel-type arrangement in order to include the greatest number of students in the video picture.

The session with students included both technical and presentation information, such as how to dress to complement the video image. Students were asked not to wear white, because cameras tend to darken to minimize the glare of white fabric. As a result, facial features can be lost, particularly on those with darker complexions. Students were also shown how to turn on and speak directly into the microphones so that they could be heard. Participants were advised that if they spoke too quickly or too softly, those at the other sites would miss words or parts of words, making speech unintelligible. Similarly, students were told that quick, animated movement of their hands and bodies would cause the image to break up, looking jerky to those at the receiving sites. Participants were asked to minimize such movements. Students listened carefully to their coaching and practiced with the equipment.

In addition to technical issues regarding visuals and sound, communication issues were addressed in the student orientation meeting. Participants were urged to look into the camera when speaking rather than at the monitor displaying the image of those at the remote site. Initially, students felt awkward interacting this way; however, they soon realized that by gazing into the camera, they appeared to be looking directly into the eyes of the distant participants, increasing the visual communication with those on the other end. Also, students were asked to consider rewriting their position papers as speeches, simplifying the information, repeating the basic ideas several times, speaking clearly and conversationally rather than reading, and allowing facial expressions to animate their presentation. Finally, students were forewarned that there would be a delay of several seconds in the audio response from the other site as a result of the compression process.

Unfolding of the videoconference

The videoconference on U.S. Presidential elections was held in November of 1996, almost immediately following Election Day, with students from both UT-Martin and Austin Peay attending. A simple presentation format was planned: American students would present in English their personal political statements which French students had had the opportunity to read and study in advance. After the statements were given, the French students would pose questions either to specific individuals or to the American students in general. Finally, there would be an opportunity for open discussion among the French and American students, time permitting.

As the conference unfolded, the American and French students briefly introduced themselves. Most American students opted not to risk speaking extemporaneously on their topics and began reading their position papers. Even though students had been instructed to read slowly into the microphone, their excitement caused several of them to speak so quickly that the French students interrupted and asked them to slow down. It was not until halfway into the conference that the technology and process became transparent enough for students to begin to talk about very personal views on difficult issues, such as racism and right wing politics in French presidential elections. As an outgrowth of this discussion, race and racism became a topic for the following year's series of exchanges.

A difficulty occurred when a third classroom of American students observing the videoconference did not mute the microphones at their site. Certain remarks made by the presenting students set off laughter among those observing. This interruption caused the cameras, and thus the focus of the conference, to be diverted to the wrong site. The continuing noise kept control of the cameras for some five minutes until students at the third site quieted enough to allow the conference to resume.

Lessons learned

In the process of carrying out this first in a series of videoconferences, we learned a number of lessons that might be helpful to those undertaking or considering similar compressed video projects on their campuses.

It is important to establish the focus of the videoconference early to allow students ample time to research the conference topic. In addition, it is essential to set realistic communication goals. Students may not speak their best when nervous--but their appreciation for the exchange will be enhanced if the experience is pleasant and positive.

Organization is essential. Plan at least an hour for each videoconference session to allow students ample time to express their views and to allow open discussion to develop. If possible, coordinate the subject of the videoconference with course content and choose your partner school carefully. Ideally, students should be of similar proficiency levels, and schools should have conferencing equipment with the capacity to connect at similar speeds. Give students ample time to rehearse speeches or questions, and schedule a dress rehearsal with students, complete with technology usage.

It is important for teachers to familiarize themselves with any technology used. If an instructor is nervous or rattled, the students will be equally so. Instructors at ease with the equipment can guide students comfortably through the experience. Learn to anticipate any time lag or jerkiness that may occur as a result of video compression. If possible, use the technology throughout the planning process to smooth the transition into the videoconference.

To calm initial nerves, try using icebreakers. This tactic will help relax the atmosphere and encourage spontaneous exchange at the videoconference. Prepare students to speak rather than to read their texts. Encouraging students to state, elaborate, and restate their points will enhance comprehension for the listeners at distant sites.

Although oral proficiency levels of the two partner classrooms should ideally be matched, it is inevitable that some differences will occur. While it is helpful to have a student to facilitate communication at each site, French students have emphasized that they prefer having a typical American student to one who is a native French speaker. They like to hear American students stating their opinions without mediation by foreign students, even if occasionally student grammar is less than perfect in French.

We were initially disappointed that French students didn't contact the American students by e-mail after the conferences, but then we learned that very few French students had access to e-mail in 1996-1997. Since that time, private and university e-mail accounts have become more common for French students, and e-mail dialogs between individual Mercury Project participants became quite commonplace.

Expect the unexpected; it is a mixed blessing--both unforeseen difficulties and unforeseen breakthroughs in communication can occur. For example, if there are outside observers, have the microphones at their site muted to avoid unanticipated interruptions.

Conclusion

Students benefited from the project in several ways. The videoconference provided American students with up-to-date information on French presidential politics--an important aspect of contemporary French culture. It also gave students of both cultures access to the way their foreign peers perceive political issues; such interpersonal exposure is not so readily available by other means. Additionally, the compressed video meeting offered students live, extemporaneous speaking and listening opportunities with French nationals of their own age. Such contact with native speakers may otherwise be somewhat limited for a university with a small foreign language program. As compared with e-mail and website exchanges, the videoconference occurred in real time and views were expressed extemporaneously. Were it not for the face-to-face opportunity provided by the videoconference, this kind of authentic exchange would not have been possible.

Response to this project was generally excellent. Despite some frustrations with background noise and difficulties in learning to use the equipment effectively, students generally expressed high satisfaction with the project. Several students declared the

videoconference to be one of the most positive foreign language events they had experienced.

In addition, a videoconferencing project creates a relationship among institutions that naturally encourages and enhances study-abroad partnerships. By connecting real faces and voices to the second language experience, students have an additional motivation to study abroad and, perhaps, less fear of initial encounters with their peers overseas.

Supported by web and e-mail technology, an undertaking, such as the *Projet Mercure*, has the opportunity to extend and endure far beyond the typical classroom experience. As Maya Angelou said to a 1997 national meeting of foreign language teachers, we learn languages so that one human being can say to another, "This is how I feel. This is how I think. This is what I believe." Through the immediacy and interactivity of videoconferencing, these are concepts that students at French and American universities have a compelling means to express.

Are Your Students Ready for College?
Technology Literacy at Georgetown College

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Abstract

College students need to understand how technology is used to gather, manipulate, and communicate data and knowledge. In 1999, Georgetown College established the *Information Technology Literacy Program* that requires new students to demonstrate basic proficiencies in the use of information-technology resources as a requirement for graduation. Students are given a task-based technology assessment test within the first three weeks of their first semester. The test results are then used as an advising tool to determine if the student needs additional technology skills. A summary of the first two years of this testing data as well as specific trends are discussed.

Terms Used in This Report

Although it could be argued that there is a distinction between the terms "concept", "proficiency", and "skill", for the purposes of this report, no distinction is made between them, they are treated as being synonymous.

The term "Internet" is used in its proper sense to include the World Wide Web, email, gophers, FTP, library research databases, and so forth.

The term "Intranet" is used to refer to the Georgetown College campus information network.

The terms "computer literacy", "information literacy", and "digital literacy" are often used synonymously. The authors feel that the latter two are more appropriate terms as each suggests a broader set of tools and skills than "computer literacy".

Georgetown College — Technology Literacy

Background

During 1997-98, the Executive Vice President and Provost of Georgetown College, requested a recommendation concerning what constitutes computer literacy. The issue was based upon the Southern Association of Colleges and Schools (SACS) requirements. SACS states, in section 4.2.2, *Undergraduate Completion Requirements*, that "The institution must demonstrate that its graduates are competent in ... the basic use of computers".

The Process

To address the issue of the SACS requirement, faculty, staff and upper-class students across a variety of academic disciplines were interviewed. Each interview began with two questions: (1) *What technology proficiencies (or skills or concepts) are necessary, and should be required, of every graduate of Georgetown College?* and (2) *When is it most appropriate that we ensure that our students develop these skills?*

Lastly, information was gathered from a number of other liberal arts colleges (Appendix A) to see how these schools addressed this issue. This information was obtained by reviewing academic catalogs as well as academic information posted online at the web sites of these institutions. If clarifying information was needed, an appropriate person was contacted by email or telephone.

Recommendation for An Information Technology Program

Information Literacy is ... The Theme

At the heart of every discussion concerning information literacy is the point that all students, college or otherwise, need to understand how technology is used to gather, manipulate, and communicate data and knowledge. Students must be empowered to become knowledge gatherers by using technology along with, not instead of, more traditional tools. After all, technology is just another tool to be added to the process of gathering information.

According to Paul Gilster (1997), "Digital literacy is the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers". We believe that definition must be extended to include the ability to **create** information in multiple formats using a variety of computer tools and to then **present** that information via a computer and some output device such as a printer or projection system.

In addition, students need to learn that a certain body of programs, for example word processing programs, all essentially operate in a similar manner regardless of platform. Thus the process of building literacy is one of empowering students to have the confidence that, if and when they are confronted with a new application or a different platform, they will have the self-assurance to proceed.

It became clear that if Georgetown College was to fully educate its students, then the College must ensure that its students were digitally literate. Georgetown students must not only acquire the skills of being information gatherers in an increasingly digital world, but they must also acquire the skills to be information creators. It is equally important, in both the case of being a "gatherer" and a "creator", that Georgetown students be able to discover and evaluate content before deciding how to put it to use. In short, the College must remember that information literacy is achieved not by mastering keystrokes but by understanding the impact of ideas.

To ensure that Georgetown College students become technologically literate, the College instituted the Information Technology Literacy Program in the fall of 1999.

When are the Skills Needed?

Even though the SACS requirement is a graduation requirement, it was agreed that students must acquire these skills as soon as possible after matriculation, preferably prior

to the beginning of their sophomore year. All of the skills are vital to the success of college students. Consequently, allowing students to postpone the development of these skills would be doing a disservice to the students.

The Information Technology Literacy Program

Requirements for Undergraduate Degree Catalog Statement

Information technology proficiency is a requirement for graduation. Students must demonstrate basic proficiencies in the use of computers and related information-technology resources. Students may satisfy this requirement by passing a proficiency examination administered during the student's first semester at Georgetown College. If proficiency is not demonstrated students may take the necessary technology workshops and then retake the examination, or successfully complete CSC120. Students are encouraged to satisfy the technology proficiency requirement during their first year at Georgetown College.

Proficiency Areas

- Internet (search engines, etc.)
- Library Web-Based Databases, Online Catalogs (Proquest, EBSCO, etc.)
- Email
- Word processing
- Spreadsheets
- Databases
- Presentations

Testing Methodology, Procedures

What Happens During Orientation?

The Technology Literacy Program Coordinator meets with new students during orientation to explain the purpose of the assessment test and the options they will have depending upon their test scores. In addition, the students receive assigned test times.

The Test – Logistics and Consequences

Students are tested in groups of ~40 at a time over the first two to three weeks of the new semester. All testing is done in the two computer labs in the College's Learning Resource Center. Testing is done in the early evening, Sunday through Thursday. The test is not

timed. Students are allowed to leave at any time after they complete the test. The average time it takes to complete the test is ~3.5 hours; some students complete all parts in less than two hours, while others take longer than five.

The assessment test covers the seven proficiency areas as noted previously; each area is tested separately with its own "sub-test". The passing score for each "sub-test" is at 50%. Students must achieve a passing score in five or more areas out of the seven to be deemed "technology proficient". Since the assessment test is rather rigorous, and since all seven of the "sub-tests" must be completed in a single sitting, it was felt that the minimum passing score for the assessment test should be less than the minimum passing grade (60%) for a class covering technology skills. In a technology skills class, the student has the opportunity to collaborate with a partner, to get help from fellow students, and to get help from the instructor. On the other hand, during the assessment test, the student is "on his (or her) own". Lastly, the assessment test is viewed as setting the minimum baseline of technology skills for technology proficiency, not as setting the standard for technology proficiency.

The student is given the following options based upon his/her assessment test scores:

- If the student passes 5, 6, or 7 out of 7, the student is deemed "technology proficient" and no further technology work required of the student
- If the student passes fewer than 5 areas, then the student is deemed "not technology proficient". To become "technology proficient", the student has several options
- she/he may take Application Software (CSC120)
  - at the conclusion of each section of the course, the appropriate module of the assessment test is given.
  - the student must pass this course with a "C" or better to be deemed "technology proficient"; the student's grade is based upon homework exercises and performance on the assessment test.
  - or s/he attend leader-directed, hands-on workshops and/or use online, self-paced tutorials.

In either case, the student must retake "failed" portions of the assessment test; there is no limit on the number of times the student can retake the test.

The Test

The assessment test that covers word processing, spreadsheets, databases, and presentations is an "online" test using SAM 2000™ from Course Technology/Thomson Learning <http://www.course.com/>. SAM is a real-time, task-based assessment as the student is presented with a variety of tasks in Microsoft Office 2000 while working live with Word, Excel, PowerPoint and Access (see Appendix B). Currently, the assessment test for Internet searching, the use of research databases, and email skills is done as a written test (see Appendix B). This test simply measures the student's ability to recall information. Starting with next fall's test, the plan is to use Blackboard™ from

Blackboard, Inc. <http://www.blackboard.com/> to develop a task-based, online test for these areas.

The Information Technology Literacy Program Web Site

The Information Literacy Program Web Site, <http://spider.georgetowncollege.edu/tlc>, was developed to serve as a central location for all of the information that the student needs regarding this program. Included at the site is a program description, workshop options and schedules, how to contact the Student Technology Mentors for assistance, assessment test study guides, the Technology Literacy Course Matrix, and so forth.

The Information Technology Literacy Course Matrix and Advising

Although the process described above would deem that a student that passed five areas but failed two to be "technology proficient", it is possible for such a student to be deficient in essential skills. For example, suppose that an intended business major passes all areas *except* presentations and spreadsheets. This hypothetical student would be deficient in essential skills required of business majors. Consequently, it was determined that students need to be advised as to the technology skills required in both their major courses as well as other courses. If we are going to designate students as being "technology proficient" based upon the results of an assessment test, we need to also ensure that they develop the correct skill set for their major.

To aid the advising process, a matrix showing the necessary technological skills for all courses offered was produced. This matrix represents a snapshot of what technology skills are utilized in the courses currently taught at Georgetown. The course matrix is updated on an annual basis. The courses were rated so that the student would know which technology skills were required for student success in the course and which were desired but not required for student success.

Results

The Typical Georgetown College Student

Tables 1, 2 and 3 statistically describe first-time Georgetown College freshmen.

Table 1
Georgetown College — First-Time Freshmen Statistics

	2000	1999	1998	1997	1996
ACT Average					
Male	23.98	24.03	23.76	24.07	23.69
Female	24.39	23.86	23.80	24.47	24.24
ACT Average (mix/match1[1])	25.00	24.77	24.61	24.95	24.30
HS GPA	3.52	3.53	3.46	3.48	3.39
Male	3.40	3.42	3.31	3.32	3.17
Female	3.61	3.60	3.58	3.59	3.53
Governor's Scholars	19	19	29	19	18
Valedictorians	25	33	31	16	19
Salutatorians	11	14	15	17	12
Foreign Countries	4	1	0	0	1
Out-of-State	18%	17%	14%	19%	13%
Male	42.9%	39.4%	45.1%	39.3%	40.0%

Table 2
First-Time Freshmen High School Class Rank

	2000	1999	1998	1997	1996
Top 10%	38%	38%	35%	40%	34%
11-20%	21%	20%	20%	18%	18%
21-30%	14%	14%	16%	16%	15%
31-40%	10%	11%	12%	12%	10%
41-50%	6%	8%	7%	5%	6%
51-60%	6%	2&	5%	4%	6%
61-70%	4%	2%	3%	3%	5%
71-80%	2%	2%	2%	2%	4%
81-90%	0%	2%	0%	0%	1%
Lowest 10%	0%	1%	0%	0%	1%

1[1] Mix/Match average is arrived at by taking the highest subscore from multiple test sessions and recalculating the ACT composite. RAP (restricted admits) students have been removed.

Table 3
First-Time Freshmen by Ethnic Breakdown

	2000	1999	1998	1997	1996
American Indian	0	1	0	0	0
Asian/Pacific Is.	2	0	0	0	0
Black	3	4	11	6	7
Hispanic	3	1	1	3	1
Non-Res Alien	5	1	0	0	1
White	318	333	396	385	317

Assessment Test Results

To date, the class of 2003 (entered Fall of 1999) and the class of 2004 (entered Fall of 2000) have taken the Technology Assessment Test. In each of the first two years of testing, less than 50% of the students that took the assessment test actually passed (see Tables 4, 5, and 6).

Table 4

Assessment Test — Overall Results*

Class Entered	# Pass	% Pass	# Fail	% Fail	No Take
1999	151	68%	70	32%	56
2000	121	47%	135	53%	83

* These results include students that took the assessment test during orientation, students that returned to retake failed "sub-tests", and students that passed CSC120 with the grade of "C" or better. Students who are no longer at Georgetown are not included even if they originally took the test.

Table 5

Assessment Test — Results by Sub-Test

Word Processing							
Class Entered	# Pass	% Pass	High Score	# Fail	% Fail	Low Score	Mean Score
1999	191	94	94	13	6	3	55
2000	188	73	98	68	27	0	58
Spreadsheets							
Class Entered	# Pass	% Pass	High Score	# Fail	% Fail	Low Score	Mean Score
1999	113	55	90	94	45	0	58
2000	79	31	90	177	69	0	34
Data Bases							
Class Entered	# Pass	% Pass	High Score	# Fail	% Fail	Low Score	Mean Score
1999	130	64	90	74	36	0	58
2000	60	23	92	196	77	0	29
Presentations							
Class Entered	# Pass	% Pass	High Score	# Fail	% Fail	Low Score	Mean Score
1999	140	69	90	63	31	0	60
2000	102	40	90	154	60	0	36
Internet, Email, Research Databases							
Class Entered	# Pass	% Pass	High Score	# Fail	% Fail	Low Score	Mean Score
1999	199	92	92	18	8	32	72
2000	204	80	96	52	20	0	60

Discussion

In spite of all of the emphasis (and money spent) on technology in the K-12 arena2[2], why are a significant number of incoming Georgetown College students not "technology proficient", at least based upon our assessment test? Why is the initial passing rate less than 50%? The low scores seem to indicate that the program is a needed and potentially valuable asset to the student's success in college coursework.

2[2] see "National Educational Technology Standards for Students. An International Society for Technology in Education (ISTE) initiative" and "Kentucky's Learning Goals And Academic Expectations. Kentucky Department of Education" for examples of student technology standards. See "Kentucky Education Technology System 99/2000 Student & Teacher Workstation Ratios" as one form of evidence of technology expenditures in Kentucky K12 schools.

The Technology Literacy Program is designed to ensure that all new Georgetown College students begin their academic study at the same baseline with regard to technology. The assessment test administered when they arrive will ensure that all students will have the opportunity to achieve this baseline immediately should they be found deficient. The technology course matrix when used as part of the advising process will ensure that all students will know what technology skills are part of each course and the student, if necessary, can develop these skills using online tutorials or by taking a workshop. Furthermore, by removing the instruction of baseline technology skills from the academic classroom, instructors are now freed from having to do this instruction. Instead of taking vital class time to teach students how to do word processing, English instructors can instead concentrate on writing. Or, instead of taking vital class time to teach students how to make a spreadsheet, Accounting and Marketing instructors can instead concentrate on "what if" analysis.

Several problems still need to be addressed, however. First is the length of the test. Many students seem to 'give up' before the testing is complete. A further analysis of the test questions may point out ways of shortening the test. Second, many students are not showing up for their testing appointment. Even though the test is required, students are putting it off beyond the freshman year. This defeats the primary purpose of the test and, for some faculty, creates a doubt as to the technology competency of all students. Third, students need continuing assistance on problem areas in technology. Some students that do not pass given portions of the test either do not choose to take the technology course. Others need additional support beyond what is taught in class or by tutorials. The college is working to address this problem by training students to act as technology trainers and help desk support.

Furthermore, the assumption is that within the next five years or so, a requirement for a single, specified course will no longer be needed; workshops and online tutorials will still be needed but the bar that sets the baseline of skills will most likely be raised. Without exception, other schools found that initiating a required course and also initiating a concomitant faculty development program was a good **first step**. However, the second step after the program had time to work (in most cases, five years or less) was to drop the required course simply because it was **no longer needed as a required course** for all students. The reason was twofold: one, new students arrived on campus with more skills than those of previous students; two, as the skills of the faculty increased, more technology was integrated into the curriculum. As a consequence, the goals of the program were now being achieved not by offering a single course but by using the technology tools throughout the four-year curriculum in several courses in all departments. In either case, whether there is a required course or "technology across the curriculum" is a reality, the goals are still the same: one, to ensure that students acquire the skills of being both information gatherers and information creators; and, two, to be able to discover and evaluate content before deciding how to put it to use.

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Appendix A — List of Schools Surveyed for This Study

The following schools were used for comparative purposes in this study. Dr. Garvel Kindrick, Director of Institutional Research, provided a list of the Georgetown College's "benchmark" schools with data indicating how these BA1 Institutions were selected as benchmarks. Using that information, plus information about other liberal arts colleges that WSR was aware of, the following schools were selected. The **Benchmark?** column is coded as follows:

- "CIRP" schools are those that answered YES to all four questions of the CIRP research survey

- "NCHEMS" are those additional schools not answering YES to all four questions on the CIRP survey but added by Georgetown College to its benchmark list because of proximity and/or overlap of applications

- "WSR" are those additional schools selected by William Rafaill for this project for comparative purposes either because of their geographic proximity and/or their reputation for technology

NOTE: This list was compiled during the 1997-98 academic year. The categorization of these schools may have changed since that time.

Institution	State	Web Address	Benchmark?
Agnes Scott College	GA	http://web.agnesscott.edu/	WSR
Albion College	MI	http://www.albion.edu	CIRP
Alma College	MI	http://www.alma.edu/	NCHEMS
Augustana College	IL	http://www.augustana.edu/	WSR
Berea College	KY	http://www.berea.edu/	NCHEMS
Berry College	GA	http://www.berry.edu/main.html	WSR
Bethune-Cookman College	FL	http://www.bethune.cookman.edu/	WSR
Carleton College	MN	http://www.carleton.edu/	WSR
Carson-Newman College	TN	http://www.cn.edu/	WSR
Central College	IA	http://www.central.edu/	NCHEMS
Centre College	KY	http://www.centre.edu/	CIRP
Coe College	IA	http://www.coe.edu/	NCHEMS
Colby College	ME	http://www.colby.edu/	WSR
Covenant College	GA	http://www.covenant.edu/	WSR
Davidson College	NC	http://www.davidson.edu/	CIRP
Eckerd College	FL	http://www.eckerd.edu/	WSR

Elmhurst College	IL	http://www.elmhurst.edu/	WSR
Erskine College	SC	http://www.erskine.edu/	CIRP
Flagler College	FL	http://www.flagler.edu/	WSR
Franklin College	IN	http://www.franklincoll.edu/	NCHEMS
Furman University	SC	http://www.furman.edu/	NCHEMS
Goshen College	IN	http://www.goshen.edu/	CIRP
Guilford College	NC	http://www.guilford.edu/	NCHEMS
Hanover College	NC	http://www.hanover.edu/	CIRP
Hastings College	NE	http://www.hastings.edu/	NCHEMS
Hope College	MI	http://www.hope.edu/	NCHEMS
Houghton College	NY	http://www.houghton.edu/	NCHEMS
Huntingdon College	AL	http://www.huntingdon.edu/	CIRP
Illinois College	IL	http://www.ic.edu/	NCHEMS
Knox College	IL	http://www.knox.edu/	WSR
LaGrange College	GA	http://www.lgc.peachnet.edu/	WSR
Millsaps College	MS	http://www.millsaps.edu/	NCHEMS
Morehouse College	GA	http://www.morehouse.edu/	WSR
Olivet Nazarene University	IL	http://www.olivet.edu/	WSR
Presbyterian College	SC	http://www.presby.edu/	NCHEMS
St. John's University	MN	http://www.csbsju.edu/	CIRP
St. Leo College	FL	http://www.saintleo.edu/	WSR
St. Olaf College	MN	http://www.stolaf.edu/	WSR
Transylvania University	KY	http://www.transy.edu/	NCHEMS
University of the South	TN	http://www.sewanee.edu/	CIRP
Wartburg College	IA	http://www.wartburg.edu/	NCHEMS
Wesleyan College	GA	http://www.wesleyan.peachnet.edu/	WSR
Westminster College	PA	http://www.westminster.edu/	NCHEMS
Wheaton College	IL	http://www.wheaton.edu/	WSR
William Jewell College	MO	http://www.jewell.edu/	CIRP

Appendix B— The Assessment Test Tasks

Each SAM test requires the student to perform a variety of tasks while using Microsoft Access, Excel, PowerPoint and Excel. The tasks for each of these tests is listed here.

Access Tasks

~~1.~~ 1. Create a table with specified fields types and formats.

~~2.~~ 2. Use the Office Assistant to find information on changing a field's data type.

~~3.~~ 3. Open a specified table from the Database window and leave it open. Open a specified table from the Database window and print it.

~~4.~~ 4. Select specified record and print it.

~~5.~~ 5. Open a specified table, navigate to the last record in the table, and enter data in a specified field.

~~6.~~ 6. Open a specified form, move to the last record. Change the data in a specified

~~7.~~ 7. Use a Database Wizard to create a new database.

~~8.~~ 8. Create a database in the Design . Use the Table Wizard to create a new table as specified. Use the Form Wizard to create a new for form

~~9.~~ 9. In a specified table, set a primary key for sorting.

~~10.~~ 10. In a specified table, change the specified field from one data type to another.

~~11.~~ 11. In a specified table, move the specified field to a new position.

~~12.~~ 12. In a specified table, delete a field.

~~13.~~ 13. Use the Form Wizard to create a new form based on a specified table.

~~14.~~ 14. In a specified form, change the format of a field as directed

~~15.~~ 15. Switch to design view in the specified table.

~~16.~~ 16. In a specified table, enter new record information

~~17.~~ 17. In the specified form, add a new record using the data given.

~~18.~~ 18. In a specified table, delete the last record.

~~19.~~ 19. In a specified table, use the Find command to locate a specified.

~~20.~~ 20. In a specified table, sort records in ascending order by title.

~~21.~~ 21. Print Preview a specified report. Do not print the report.

~~22.~~ 22. In a specified report, select all the labels in the Page Header section and format them as specified.

~~23.~~ 23. In a specified report, change the caption of the label as directed.

~~24.~~ 24. In a specified form, insert a clip art graphic as directed.

Excel Tasks

~~1.~~ 1. Delete contents of the specified cell. Undo the last action performed in this spreadsheet.

~~2.~~ 2. Enter the given label in the specified cell.

~~3.~~ 3. Enter the given date in the specified cell.

~~4.~~ 4. Cut the contents of the specified data range and then Paste the data into a different, specified data range.

~~5.~~ 5. Copy the specified cell and then use Paste Special to Paste the values only in different, specified cell.

~~6.~~ 6. Clear all formatting in the specified cells.

~~7.~~ 7. Auto Fill the specified cells with the months "Oct" through "Mar".

~~8.~~ 8. Change the color of the font of a specified word in a cell to Red.

~~9.~~ 9. Apply the Currency number format to the data in a specified data range using a specified currency format.

~~10.~~ 10. Apply a Date number format to the specified cell A4 using a specified date format.

~~11.~~ 11. Change the Width of the specified columns to a specified width.

~~12.~~ 12. Center the contents of the specified cells.

~~13.~~ 13. Use the Format Painter command to apply the format of one specified cell to a specified range of cells.

~~14.~~ 14. Add the specified border style to the specified cells.

~~15.~~ 15. Apply the specified cell shading to the specified cells.

~~16.~~ 16. Merge and Center the specified cells.

~~17.~~ 17. Print the current worksheet.

~~18.~~ 18. Create a Custom Header with the specified text.

~~19.~~ 19. Insert a new row after the specified row.

~~20.~~ 20. Delete the specified column.

~~21.~~ 21. Freeze all rows at the specified location.

~~22.~~ 22. Insert a new worksheet at the specified location.

~~23.~~ 23. Move the specified worksheet to the specified position in the workbook.

~~24.~~ 24. Insert a 3D reference to consolidate and link the specified data in three different worksheets into the specified cell of the fourth, consolidation worksheet.

~~25.~~ 25. Replace the specified cell reference in the formula found in a specified cell with the specified data range by dragging to select the appropriate cells.

~~26.~~ 26. Using the formula bar, enter a formula in the specified cell to perform the given calculation.

~~27.~~ 27. Change the formula in the specified cell to use Relative References (column and row) to the values in the specified cells.

~~28.~~ 28. Use AutoSum in the specified cell to calculate the total of a given data range.

~~29.~~ 29. Use Paste Function to Insert a function in the specified cell to perform the specified calculation.

~~30.~~ 30. Enter a formula in the specified cell that calculates the average of the values in a specified data range.

~~31.~~ 31. Use the DATE function to enter a specified date into the specified cell.

~~32.~~ 32. Insert an IF function in a specified cell to perform the specified logical actions. Then copy the formula from specified cell to a range of cells as specified.

~~33.~~ 33. Print Preview the specified chart

~~34.~~ 34. Create a Column chart using the specified data. The chart will not have a legend but will include a chart title and X and Y axis labels.

~~35.~~ 35. Paste a link from a specified cell of the specified worksheet to a specified cell of a different, specified worksheet so that its value is displayed in both places.

~~36.~~ 36. Apply to the specified cells the Accounting number format using the specified Accounting style.

~~37.~~ 37. Create a Custom number format for the specified range of cells as directed.

~~38.~~ 38. Sort the data list given using a single key sort as directed.

~~39.~~ 39. Sort the data list given using a multiple key sort as directed.

~~40.~~ 40. Insert the specified comment in a specified cell

PowerPoint Tasks

~~1.~~ 1. Delete the specified slide from the presentation.

~~2.~~ 2. Insert a new slide at a specified point using a specified AutoLayout.

~~3.~~ 3. Change the title of a slide as specified; then save the presentation with the specified, new filename in a specified folder.

~~4.~~ 4. Insert a footer with the "Date and time" option set (updated automatically) on every slide except the title slide.

~~5.~~ 5. In Slide Sorter view, move the specified slide to the end of the presentation.

~~6.~~ 6. Automatically replace every occurrence of the specified name with a different, specified name.

~~7.~~ 7. Change the layout of a specified slide to the "Title Slide" layout.

~~8.~~ 8. On the Slide Master, change the font size of the Master title style to 54 pt.

~~9.~~ 9. In Outline view, move a specified slide to a new, specified location.

~~10.~~ 10. Apply a specified design template to the presentation.

~~11.~~ 11. Use the Spelling dialog box to spell-check the entire presentation.

~~12.~~ 12. In Normal view enter the specified text as the last bulleted item on the final slide in the presentation using the Outline pane or the Slide pane.

~~13.~~ 13. Center-align the specified bulleted items.

~~14.~~ 14. Use the Format Painter to apply the format of the first bulleted item on the specified slide to the remaining bulleted items

~~15.~~ 15. On the specified slide, promote the specified text so that it becomes a slide title for a new slide.

~~16.~~ 16. Insert a specified clip art image on the current slide, at a specified location. Make sure the art does not overlap the text on the slide.

~~17.~~ 17. Apply the a specified Slide Transition effect to the entire presentation.

~~18.~~ 18. Add the a specified animation effect to the slide text (the bulleted list).

~~19.~~ 19. Preview the presentation in greyscale.

~~20.~~ 20. Print the entire presentation as handouts containing six slides to a page.

~~21.~~ 21. Set up the slide show to begin with Slide 4.

~~22.~~ 22. Insert the specified text in the specified line, and then save the presentation.

~~23.~~ 23. Save the presentation under a new, specified name in a specified folder.

~~24.~~ 24. Insert a hyperlink on a slide to a specified web address.

~~25.~~ 25. On a specified slide, animate the chart object so that chart elements appear by category.

~~26.~~ 26. Insert the specified gif file at a specified location on a slide.

~~27.~~ 27. Insert a table from Microsoft Word on the current slide with two columns and two rows.

~~28.~~ 28. Insert the specified Microsoft Excel chart on the last slide in the presentation.

~~29.~~ 29. Add a specified sound file at a specified location on the current slide.

~~30.~~ 30. Create a column chart on the current slide using the specified column headings and data.

Word Tasks

~~1.~~ 1. Use the Undo command to remove the last formatting applied in the document.

~~2.~~ 2. Apply Italic formatting to the specified text.

~~3.~~ 3. Underline the specified text.

~~4.~~ 4. Check the document for spelling errors using the tools in the Spelling and Grammar dialog box.

~~5.~~ 5. Highlight the specified text with Red highlighting.

~~6.~~ 6. Insert a specified word the end of a specified paragraph.

~~7.~~ 7. Move a specified sentence to a new, specified location.

~~8.~~ 8. Cut the specified text and paste to a new, specified location.

~~9.~~ 9. Use the Format Painter to copy the formatting of the specified heading to a different, specified heading.

~~10.~~ 10. Change the Font of the specified text to a different, specified font.

~~11.~~ 11. Change the Font Size of the specified text to a different, specified font size.

~~12.~~ 12. Automatically replace every occurrence of the specified text with a different, specified text.

~~13.~~ 13. Insert today's date at the specified location using the specified date format. Set the date to Update automatically.

~~14.~~ 14. Insert the specified symbol at the specified location.

~~15.~~ 15. Center-align the specified line of text.

~~16.~~ 16. Add Bullets to the five lines of specified text beginning using the specified bullet style.

~~17.~~ 17. Add a Shadow border around the items in the specified bulleted list.

~~18.~~ 18. Apply a 0.5" Left indent to the specified paragraph.

~~19.~~ 19. Add a 0.3" First Line indent to the specified paragraph.

~~20.~~ 20. Change the Left tab at the specified location to a Decimal tab.

~~21.~~ 21. Format the specified Left tab to include a dashed leader line.

~~22.~~ 22. View the specified document in the Print Preview screen.

~~23.~~ 23. Insert page numbers in the default style at the bottom right corner of every page in the specified document.

~~24.~~ 24. Change the Left and Right margins to 1" in the specified document.

~~25.~~ 25. Change the format of the page numbers in the specified document to the specified format.

~~26.~~ 26. Insert a footer in the specified document that reads "All applicant information is kept confidential".

~~27.~~ 27. Save the current document with the same filename to a specified location.

~~28.~~ 28. Save the current document with the new, specified filename to a specified location.

~~29.~~ 29. Using the Save As command, create a new folder with a specified name to a specified location. Now save the current document into the new folder without changing the file name.

~~30.~~ 30. Insert an autonumbered footnote that reads "Required" at the specified location.

Internet, Email & Research Data Base Questions

~~1.~~ 1. What does the term "Internet" encompass? How would you define this term?

~~2.~~ 2. What does each part of an email address represent? Which part is the "user name"? Which part is the "domain name"? Which part is the "top-domain name"? What does the @ symbol represent?

~~3.~~ 3. What does each part of a web address represent? Which part represents the protocol? Which part is the name of the server? Which part is the directory or folder on the server? Which part is the file being accessed? What does the / symbol represent?

~~4.~~ 4. Why are Internet addresses of any type (web, email, etc.) always written in lowercase and always enclosed in angle brackets when included in text?

~~5.~~ 5. How would you describe the "TO:" portion of an email address? the "FROM:" portion? the "CC:" portion? the "BCC:" portion?

~~6.~~ 6. How would you describe the "SUBJECT:" portion of an email address? What does it mean when the subject is preceded with "RE:"? with "FW:"?

~~7.~~ 7. What is an "Email Attachment"? How and when would you use an email attachment? What must you do to open an email attachment?

~~8.~~ 8. What does the acronym "TCP/IP" stand for and why is it important?

~~9.~~ 9. What are "COMPUTER PROTOCOLS" and why are they important?

~~10.~~ 10. What does the acronym "HTTP" stand for and why is it important?

~~11.~~ 11. What does the acronym "FAQ" stand for and why is it important?

~~12.~~ 12. What does the acronym "URL" stand for and why is it important?

~~13.~~ 13. What does the acronym "HTML" stand for and why is it important?

~~14.~~ 14. What is the difference between a "WEB SERVER", a "WEB SITE", a "WEB PAGE", and a "HOME PAGE"?

~~15.~~ 15. What is a "SEARCH ENGINE"? a "META SEARCH ENGINE"? a "SUBJECT DIRECTORY"? How are they related, what are their similarities and differences?

~~16.~~ 16. What are "BOOLEAN OPERATORS"? How are they used in searches? Compare the operators and give examples of the use of each.

~~17.~~ 17. What are "WEB-BASED INFORMATION SERVICES" (aka "RESEARCH DATABASES")? What kind of information would you find using these databases that you would not find using a search engine or a subject directory?

~~18.~~ 18. How does the citing of sources found electronically differ from sources found via traditional library research work? In other words, how would the bibliographic reference for an article or book found electronically differ from the bibliographic reference for an article or book actually on the shelf in the library? What would be the same about both references?

Developing Library Instruction for Distance Learning

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Abstract
Librarians involved with the development, design, and delivery of bibliographic instruction to remote access patrons must be prepared to address the challenges posed by each method of delivery (videoconferencing, computer-mediated, and web-based). An overview of each instructional medium will be provided as well as discussion regarding issues to consider when teaching at a distance. Examples of each method of delivery will be provided as well as a list of utilities and tools those teaching distributed bibliographic instruction can use to present this material.

In May 2000, the Instruction Committee of the ACRL Distance Learning Section conducted a survey through the OFFCAMP list to determine the top priorities for research on distance learning library services. Among the top five concerns were the issues of developing web-delivered classes to teach library skills, the effectiveness of web-based library tutorials, and the evaluation of online library services for remote access patrons. While most academic libraries have addressed the needs of their remote access patrons by developing a wide range of online resources to match traditional library services, many libraries still have difficulty coordinating distributed learning bibliographic instruction programs suited to match the various mediums used to distribute distance learning courses.

At Kent State University, these issues were addressed and a plan to develop new ways to incorporate bibliographic instruction into the university's distance learning program was initiated. Although the librarians involved (myself, included) knew much about the elements necessary to develop and design instruction for distributed learning, the course planning and distribution proved to be a "lessons learned" experience. There are various challenges associated with each method of delivery (videoconferencing, computer-mediated, and web-based) and specific elements one must consider when presenting instruction in these mediums.

Videoconferencing

Videoconferencing is the ability of two or more distant groups to communicate face to face in real time by using a combination of audio or video equipment. At Kent State University, we rely on a V-Tel dial up system that sends compressed audio/video signals over a dedicated line. Each of the seven regional campuses is equipped with a V-Tel lab. However, very few courses taught in this format have included sessions for bibliographic instruction. One reason is related to the scheduling of a session during the delivery of the

course. Most V-Tel instructors wish to use all class time for the course material and assert that library time should be spent outside of class. Faculty/library collaboration in V-Tel instruction proves to be a great challenge, but there have been some successful attempts to coordinate bibliographic instruction in some of the business and educational courses offered through V-Tel.

In our experience, the following issues must be considered when developing a library instruction component for a videoconferencing course:

Instruction planning is a must. It is recommended thorough planning of the material to be presented be organized and outlined very carefully. Some instructors assume that they can "teach from the hip" in a videoconferencing course, but the contrary proves true. Unlike a traditional setting where a librarian provides a orientation to the library and its services to a group of students, a librarian using a videoconference to present information must be certain that students at the remote sites have access to the same materials being presented from the instructional site. For example, in one case the librarian at the instructional site presented to the class several business reference resources and distributed these materials to the on-site class. The students at the remote sites sat and watched the materials being passed around.

To address this issue, we felt that it was best to include the library staff at the remote sites during the presentation to assist tin the distribution of materials. It was also wise for the students at all sites to meet potential library contacts at the other regional campuses. In addition, it is best to provide students and library staff a detailed outline and corresponding handouts to the instruction that will take place. This information is important should technical difficulties arise and the class cannot be delivered to one of the sites.

It is recommended that librarians do a trial run of their instructional session prior to the actual date of the presentation. It is difficult to accommodate to a new teaching medium and knowing how to troubleshoot potential problems that may arise with the technology is important to avoid what can become a very frustrating experience. Learning how to use the equipment to vary the instructional method for use of software, slides, and other library materials will also improve the overall quality of instruction.

Request a list of the names of the students at each site. Instructors should not initiate discussion by referring to a group of students by their site name. Students appreciate being called upon by their names. This practice will give you better control of the classroom and it will make the students at the remote sites feel included. It also will foster better interactivity among the students.

Avoid instruction in a 60-minute lecture format. Course material presented through a videoconference should be presented in segments. It is extremely difficult for students to pay attention to what we refer to as a "talking head." We suggest 10-15 minute segments to allow for questions, feedback, or demonstrations o review material. The objective is to keep the students alert. Breaking up the class into segments allows the opportunity for a

variety of teaching methods. For example, the first segment could include slides from a PowerPoint presentation, followed by a discussion/review session, followed by a segment of hands-on work. This time could also be used for students at the remote sites to work with their local library staff.

Librarians teaching through a videoconference must also realize that when they create visuals for their presentation, these guidelines should be followed:

- All television screens are wider than they are high by a ratio of 4 to 3. Visuals should be created in the same manner to coincide with the aspect ratio of the screen.
- Create all slides in a landscape rather than portrait orientation to optimize the use of space on the screen. This set-up is better for viewing graphics and other images on the screen.
- Leave a 10% border around the entire visual to provide an "essential area" for which to work. This set-up will accommodate to most monitors and ensure that the entire visual is seen.
- Be wary of visuals with a great deal of detail. It is best to present text and information in smaller units (additional slides) so users have time to process what they are reading. Too much information on a given slide can be difficult for students to follow, particularly if the slide sequencing is fast.
- Limit the number of words on a page or slide to seven per line and seven lines per page. This amount of text seems to be the maximum level at which most readers can process.
- Text should be written in 24-30 point size and in a font that has normal spaces. Do not use scripted fonts, but rather universal fonts such as Ariel. Make certain that the case of the text is written consistently throughout the presentation. Use different texts within a slide show sparingly.

An example of a videoconference lesson may include subject-specific library instruction targeted for a group assignment. For example, one business marketing class had to design a marketing campaign for a product and the librarian involved with assisting them to do research made use of the library resources to use when developing a marketing plan. One of the instructional sites the library demonstrated via the conference room computer was a site to do company research: http://iws.ohiolink.edu/companies/. The students then were encouraged to create PowerPoint outlines for the resources they used for their project.

Computer-Mediated Instruction

Another delivery method use to distribute distance education courses is through computer-mediated instruction. This medium also occurs in real time, but much more planning in the development of course content is needed since files and other online materials for instruction must be created. At Kent State University, each of the regional campuses as well as several departments on the Kent Campus have computer-mediated instructor labs referred to as I-link labs. In these labs, during a given time period, several

different classes can be going on at once since students log into the course they wish to receive. These labs include microphones and cameras with each computer as well as specific software that enables participants to engage in online chat and other bulletin board activities. All files for the courses are stored on a host server at the Kent Campus, but can be retrieved by the instructor at a remote site.

To adapt bibliographic instruction into this medium, it was decided to develop three subject-specific training sessions on the use of the databases; ERIC, CINAHL, and LEXIS-NEXIS. The reference department had already developed content for traditional instruction on the use of these databases for the library's program 60-minute seminars. The decision was to transform these mini-courses into computer-mediated modules by which remote access students could attend during a scheduled time period.

Since many of the handouts were already developed into text files, the library staff was easily able to transform thee files to the server. Using screen capture software, illustrations of search queries and retrieval results were downloaded into the module. The librarian teaching these sessions could then show students sample searches and then revert to the active search screen to allow students the opportunity to engage in their own searches. Problems arose when students attempted to replicate the same search the instructor had just completed. Some students received error messages and some computers even froze. This problem was easily resolved by assigning students different search queries to complete.

As with instruction in the videoconference format, careful planning, particularly a trial run of the course, and organized instruction segmented is necessary to ensure the success of computer mediated instruction.

The following guidelines were found to be important when teaching in the CMC format:

- It is important to include library staff at the remote sites to assist during the instruction. In one course session, students did not know what to do when the instructional screen froze. The students did not tell the instructor that there was a technical problem and the instructor failed to take note that the students at the remote site were not participating in the class. This situation illustrates why it is important to know how to use the equipment and be able to monitor potential technical difficulties. In class sessions where technical staff cannot be immediate present, instructors ought to designate one student at each site to be responsible for reporting any problems that may occur during the instruction.
- It is important that a basic orientation on how to use the equipment be provided to the students who may not be involved in a CMC course. When the library staff first developed these courses, they were associated with computer-mediated courses that would use these databases. However, after the courses were marketed as distributed learning versions of the 60-minute workshops series, students at the regional campuses not involved with distance education signed up to participate in these classes. As a result, it was necessary to provide a preliminary orientation to the features of the computer-mediated interface, the use of the chat room, the

use of the microphone and other equipment. Library staff at the remote sites took time before the actual class session to acclimate students to the equipment and to answer any questions.

- Interaction is crucial in a computer-mediated course. The chat room and bulletin board capabilities of this medium should be used to promote interactivity in the lesson. Librarians teaching in this format as well as V-Tel need to remember to divide attention equally to remote sites. In a computer mediated situation (as with videoconferencing), there are several types of interaction:
    - Student to Instructor
    - Student to student
    - Panel discussions
    - Student to technology
- It is recommended that librarians make use of each type of interaction to make the class more interesting. Students can be asked to complete individualized or group searches. Students from remote sites can form panels that research specific topics and students can interact with the lesson, itself. For example, the students can go to the database and conduct a search for their assignment. In the 60-minute sessions we conducted, teams consisting of students at the various sites were created to compete in locating answers to a library assignment. Students were allowed to consult the instructor only once and had to spend more time collaborating with one another to find the answers.

For a variety of creative ideas to use in online library instruction, The University of Minnesota provides an excellent faculty guide entitled: "Designing Effective Research Assignments for the Distance Student' at http://www.lib.umn.edu/dist/instruct/assignments.html.

Web-Based Instruction

Many libraries have organized projects to provide web-based bibliographic instruction through their library's web page. Such instruction ranges from simple "how-to" guides presented in an online format to more complicated course tutorials created through the use of software such as WebCT. Although most libraries rely upon the software available at their campus to create web documents, there are actually dozens of World Wide Web page creation tools available. A complete list along with reviews can be found at http://union.ncsa.uiuc.edu/HyperNews/get/www/html/editors.html.

When librarians decide to create web-based instructional materials, it is important that they follow the guidelines for universal page design to ensure greater accessibility for all students. All web-based documents should be created using web accessibility guidelines. The WAI site provides an extensive array of information regarding accessibility issues. (See http://www.w3.org/TR/WAI-WEBCONTENT/).

Web based library instruction should always include clear objectives for the student in the form of an outline. As with course planning for videoconference and computer-mediated instruction, it is important to organize a web-based documents so students can

easily navigate through the lesson. Lessons should be focused. (Dewald 1999) notes "tutorials designed to impart basic library skills to students should contain not only simple mechanical step-by-step directions, but also a conceptual understanding of the skill being learned."

It is important that librarians are aware that web-based library tutorials are best used in connection with academic classes rather than in isolation.

Page Design
Text presented on a given page should be limited so that scrolling can be avoided.

Breaking text into instructional units (smaller parts) can enhance learning. Using links is much more easier for students to follow than sequencing pages of text. Librarians using the web for instruction must realize than reading information from a screen can be as much as 30% slower than reading it from a paper (DeBra 1996). Nelson (1997) suggests that instructional text on the computer should be about 50% as long as would be the case if the same text were presented as hard copy.

It is also recommended that the text be broken down into multiple columns on the screen. Text and graphics should also be broken up to make the length of text more manageable to follow.

Images
The inclusion of graphics should relate to the text displayed. Dynamic moving graphics should be used sparingly to avoid distraction. Graphics should always serve an instructional purpose. Pages that are filled with multimedia take much longer to download. This set-up can be extremely frustrating for students with slower modems.

Hyperlinks
Hyperlinks should only be included if they serve a direct purpose to the text. Links should be clearly labeled to give learners a better sense of organization of the site.

Links on one page to other places within the same page should be avoided because it can cause confusion to learners.

At Kent State University, there are a variety of online instructional formats being used to teach students about library resources and services. These resources include the following:

Library Services for Students - http://www.library.kent.edu/students

Virtual Tour of the KSU Library - http://www.library.kent.edu/tour

Online tutorials

Navigating the Library - http://www.library.kent.edu/ntl

It is best that those librarians using web-based documents evaluate the use of these materials to assess their use. All too often, web documents once created are forgotten and the hyperlinks that are listed on the page no longer work. Librarians using web documents to supplement their instruction should include their email address on the web site as well as a traditional address with office phone number to be contacted for questions and assistance.

Conclusion

Although there are a variety of methods to present information to remote access students, distributed learning will not completely replace traditional methods of bibliographic instruction because most students do still prefer human interaction when they need assistance for their research projects. Librarians thinking about developing bibliographic instruction for distributed learning should explore other library sites to get ideas. The World Lecture Hall (http://wnt.cc.utexas.edu) offers a variety of library-orientated online courses. The Distance Education Clearinghouse also provides a great resource for additional information.

Perhaps the most important element in the entire process to develop library services for distance education is to coordinate collaboration with faculty. All too often, faculty who are developing distributed learning courses do not consult with the library staff for information regarding the use of the library. A research study I conducted examining the role of the library in distance education at Kent State University indicated that less than 3% of the distributed learning instructors worked with library staff in the coordination of assignments for their courses. This situation has proven to be our greatest challenge in developing bibliographic instruction for distance education. Additional research related on increasing collaboration must be done. According to the ACRL Distance Learning Section Research team, it has proven to be the number one priority.

Help! Third Graders Know More (About Technology) Than My Graduate Students!
Closing the Digital Divide

A presentation made at the
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Abstract: EDU 506 seeks to address some of the issues of the digital divide among teachers and students and seeks to put the teachers at ease with the technology. Teachers who finish this class come away with a sense of expertise and, more importantly, are no longer afraid to experiment with the technology. Administrators expect teachers to be able to integrate the technology into their classrooms and EDU 506 accomplishes its task.

Much has to been written regarding the digital divide that seemingly exists in our nation and world. Indeed, the National Telecommunications and Information Administration (NTIA) has published a study entitled, "The Digital Divide: A Survey of Information 'Haves' and 'Have Nots' in 1997". Their subtitle is "Falling Through the Net II: New Data on the Digital Divide." Their study opened with these words, "The concept of 'universal service' in U.S. telecommunications policy has traditionally referred to the goal that all Americans should have access to affordable telephone service. As America has increasingly become an information society, however, that concept has broadened to include access to information services. Now that a considerable portion of today's business, communication, and research takes place on the Internet, access to the computers and networks may be as important as access to traditional telephone services" (NTIA, 1998).

Citing a request from (now, former) Vice President Gore, NTIA analyzed "telephone and computer penetration rates across the United States to determine who is, and who is not yet, connected" with the intent of assisting "policymakers as they consider steps to connect all Americans to the Information Superhighway." This survey used data compiled by the Census Bureau in October, 1997. The Census Bureau compiled this data through 48,000 door-to-door surveys; cross-tabulated "according o specific variables, such as income, race, age, educational attainment, as well as geographic categories (i.e., rural, urban, and central city, as well as by state and region). These tabulations permit

insights into the characteristics of Americans that have access to the information infrastructure, and those that do not" (NTIA, 1998).

Highlights of the study reveal that "as a nation, Americans have increasingly embraced the Information Age through electronic access in their homes. The 1997 nation-wide data show the following nation-wide penetration rates -- 93.8% for telephones, 36.6% for personal computers (PCs); 26.3% for modems, and 18.6% for on-line access (Chart 1). Compared to the 1994 survey results, the nationwide telephone penetration has remained unchanged. The computer penetration rate, however, has grown substantially in the last three years: PC ownership has increased 51.9%, modem ownership has grown 139.1%, and E-mail access has expanded by 397.1%" (NTIA, 1998).

Additionally, the digital divide among US households persists. "Despite this significant growth in computer ownership and usage overall, the growth has occurred to a greater extent within some income levels, demographic groups, and geographic areas, than in others. In fact, the 'digital divide' between certain groups of Americans has increased between 1994 and 1997 so that there is now an even greater disparity in penetration levels among some groups. There is a widening gap, for example, between those at upper and lower income levels. Additionally, even though all racial groups now own more computers than they did in 1994, Blacks and Hispanics now lag even further behind Whites in their levels of PC-ownership and on-line access" (NTIA, 1998).

The following represents some of the more significant findings regarding computers: "Although PC ownership has grown by 10-13 percentage points in all areas since 1994, central cities again lag behind the national average for PC ownership and on-line access (32.8%, 17.3%), as do rural areas (34.9%, 14.8%) (Chart 10). Urban areas are slightly higher than the average (37.2%, 19.9%). The West's urban areas (43.9%, 23.14%) rank highest in PC and on-line access, while the Northeast's central cities have the lowest penetration rates (24.7%, 12.6%) (Charts 19, 24). After accounting for income, there is not a significant difference between rural, urban, and central city areas for computer penetration (Chart 11), although rural areas still have a significantly lower rate for on-line access" (Chart 20) (NTIA, 1998).

"Bridging the Digital Divide" (Seiden, 2000) reminds us that "the NTIA researchers were only looking at **in-home use**" She quotes from the 1999 report from the Pew Research Center for People and the Press that "62 percent of workers go online through their jobs" and "75 percent of students go online through their schools". While these numbers are good, there is "strong evidence that schools in poorer urban and rural districts have not only less hardware, but less ability to train students." Therefore, "addressing the digital divide is not simply a matter of running wire and providing public computers--it is also a matter of ensuring that people have the **requisite skills** to use the technology and that they see the relevance of the technology to their lives. This gap is not limited to socioeconomic or racial differences, but includes gender and age differences, as well." (Reference & User Services Quarterly, Summer 2000, v39, i4, p329)

Seiden (2000) indicates that "the libraries in our schools, colleges, and communities are in a position to make major inroads in addressing disparity of opportunity and education, as well as access." She encourages reference and user services staff "to decrease the disparity between the information 'haves' and 'have-nots' by developing new services and programs with relevant content that would teach the intricacies of searching and evaluating information and would provide an understanding haven for those intimidated by the technology." (Reference & User Services Quarterly, Summer 2000, v39, i4, p329)

Craig A. Cunningham, director of curriculum for the Chicago Public Schools/University of Chicago Internet Project, writes in an article entitled "Improving Our Nation's Schools through Computers & Connectivity" that while the federal government and school districts have invested "vast sums" on computers, software, and technical support and are working to connect every school to the Internet in the hope of improving the nation's schools and closing the digital divide, "many of America's teachers are unprepared to use computers in their classrooms." He states that "about 1.3 million of the nation's 3 million elementary and secondary teachers feel only somewhat or inadequately prepared to integrate educational technology into their teaching" (Cunningham, 2001).

"Using computers at a higher level--to provide the virtual reality of journeying west across the plains on a Conestoga wagon, investing funds in a stock portfolio, or dissecting a frog--requires much more of teachers. They must have ready access to computers in the classrooms--requiring not only more computers, but also more complex technical support--as well as increased familiarity with the computer and software. Teachers must also alter their curricula, so that the simulation is not just an 'add-on' but a complement to their larger instructional goals. While intelligent and motivated teachers can master these programs, it is nearly impossible to push reluctant or hidebound teachers to use simulations effectively" (Cunningham, 2001). (See also Developing Critical Thinking Skills, Lewis, 1998.) Realizing a vision of computers as productivity-enhancing mindtools is more difficult still because it requires transforming classrooms into information-rich workrooms, in which students use the Internet as a huge repository of real-world data, images, text, and other resources (Jonassen, 2000). Student progress is assessed authentically through tasks embedded in the learning process itself: through some "performance" or "product," rather than a paper-and-pencil test.

While most teachers, obviously, have the necessary mental intelligence, desire, and disposition to succeed in a wired classroom, the teaching profession does have some who prefer delivering the prepackaged curricula of textbooks and worksheets as offered by many textbook companies, using traditional tools for which they have received training long ago, and assessing student progress in traditional paper-and-pencil ways. Simply because schools across the nation will employ new teachers in the next few years who are more technologically oriented or more enthusiastic about new modes of teaching and learning does not mean that these new teachers are any more likely to integrate technology into their teaching than are 20-year veterans. "Even though younger teachers tend to be more astute in their own use of computers, the skills don't carry over to their teaching" (Cunningham, 2001).

Cunningham (2001) charges that many teacher training institutions fail to use computers effectively to train teachers. Stating that "Teacher educators as a group are even more technologically inept than are elementary and secondary teachers." This is further complicated by what he views as our inability to attract more intelligent students to the field of education – a point that many of us would debate.

Cunningham (2001) continues by observing that "today's investment in computing for schools is unlikely to close the widening gap between those in our society who have access to, and know how to use, information technologies and those who do not. Indeed, placing the computer at the center of school routines will only increase the educational advantage of students for whom computers are just a fact of daily life. Putting computers in the classrooms of such students may increase their opportunities to learn (provided that their teachers know what to do with the computers). But for students without such a comfort level, the demands of the computer will be a distraction from reading and writing and figuring or will become just a very expensive version of a textbook or workbook." He calls for "a massive effort at teacher training--not one-shot in-service workshops, but comprehensive professional development that makes possible the kinds of changes in instruction that improve student performance on higher-level thinking tasks." (Brookings Review, Winter 2001, v19, i1, p41)

Dr. Steve M. Dorman's (2000) article, "Implications of Growing Up Digital" addresses the attributes of the Net Generation (N-Gen), a term used by Donald Tapscott in his recent book, Growing Up Digital. The N-Geners are "the generation of children currently between ages 2 and 22 who represent the first generation to grow up surrounded by digital media." The computer has always been present in the lives of these children and they feel more comfortable with computers than do their parents, or teachers! They play, learn, create, communicate, and work using a computer on a regular basis.

The N-Geners are described as "accepting of diversity, curious, assertive, and self-reliant." N-Geners are information seekers rather than passive information recipients. Their access to the vastness of information presented on the Interact allows them to easily confront information they believe to be incorrect. They are "at ease with new technology and media, and they are not fearful to try new ideas and products." They seem interested in "how to make technology do the things they need to happen. They have an equal interest in how technology works. For example, they are not satisfied to use another person's website for link information. They must create their own web pages and links" (Dorman, 2000).

Implications on education and learning include predictions that "education will shift from a broadcast type of learning as demonstrated with a teacher in front of a classroom of students ("the sage on the stage" idea), to a more interactive learning facilitated by technology ("coaching from the sidelines"). The approaches to learning "will become less linear and sequential and more hypermedia driven; less teacher-centered and more learner-centered; and less instruction-oriented and more discovery-oriented" (Dorman, 2000).

Dorman (2000) concludes by saying that "technology will obviously shape the values, ideals, and interests of this group of emerging youth. Those of us who work with children and youth must prepare ourselves to understand better the technologically dominant world in which they live." (Journal of School Health, Dec 2000, v70, i10, p420)

The Graduate Studies in Education program at Freed-Hardeman University currently has about 460 students enrolled. Some 250 of these students are making career changes and are seeking initial teaching licensure, along with the M.Ed.. Most of the remaining others are active classroom teachers working on either an M.Ed. degree, an add-on endorsement at the graduate level, or the +30 (hours of graduate study).

To address some of the issues of the digital divide among teachers and students, the five projects of EDU 506 Computer Applications in Education seek to put the teachers at ease with the technology. Teachers who finish this class come away with a sense of expertise and, more importantly, are no longer afraid to experiment with the technology. Administrators expect teachers to be able to integrate the technology into their classrooms and EDU 506 accomplishes this task.

One of the first things that the author does with the students in his class is to assess each student's current level of technology expertise using the Self-Evaluation of Technology Skills. This is a modified form based on the Mankato Scale first developed by the Mankato (Minnesota) Public Schools to measure the growth of staff technology skills and further revised by the library media specialists and teachers of the Bellingham (Washington) Public Schools.

While most of the areas address professional productivity, such as writing lesson plans, record-keeping of student attendance and grades, etc., some of the areas also involve finding and evaluating material on the Internet and using e-mail for parental contacts. The score derived from this assessment is used to divide the class into dyads such that an experienced student works with a less experienced peer.

It is the author's impression, from having taught nearly 225 of these graduate students over the past couple of years, that there is a vast array of technological competencies represented by our students. Some of those seeking initial licensure are making career changes from non-technical fields and have had few computer experiences. Others have had extensive experience with word processing programs and the Internet, including e-mail, and some few have had a business background requiring the use of spreadsheets and record-keeping software. Most of our active classroom teachers, on the other hand, usually have had little experience with anything but the most rudimentary technology components and applications. In the author's opinion, this last group (experienced teachers) is often the most difficult to work with due to technophobia and a resistance to change.

The EDU 506 class, therefore, also attempts to narrow the digital divide that seems to exist between the various participants in our graduate program. Not only are various applications taught, but ways to integrate the technology into the classroom are explored

and practiced. Five major technology components are used in the class, including e-mail, Internet research, Powerpoint presentations, spreadsheets, and WebQuests.

After the class has been at work for most of the semester on various technology projects, particularly keyboarding and mouse skills, word processing applications, and e-mail, they are taken to the Scope and Sequence of Technology Skills (much borrowed, with thanks, from Eagle Lake Elementary, Mankato, MN). Eagle Lake has a range of technology activities for K-5 students in word processing, basic computer skills, e-mail, multimedia (HyperStudio), CD-ROM use, keyboarding, drawing and painting, spreadsheet use, and World Wide Web navigation. As we view together the depth and breadth of the range of technology activities that Eagle Lake is requiring of its K-5 students, it begins to dawn on them that "Third graders know more about technology than I do!" Some in the classroom are already aware that their elementary students are able to operate the technology and applications software much easier than they and that most of their students are much more at ease around computers than they are. FHU's EDU 506 addresses some of these issues of the digital divide among teachers and students and puts the teachers at ease with the technology.

The posting to the Internet of some of our projects allows the students to demonstrate their expertise to others and to share their projects with fellow teachers. Educators who use web-enhance delivery of lessons tend to be highly motivated people who thrive on creativity and enjoy learning. By sharing what we have created on the Internet, we also appreciate the feedback that comes from other professionals who have viewed and used our pages. Our class fosters a supportive and professional feedback loop so that we can all create the best learning experiences for our students.

Some of our students have gone on to complete additional web-based learning projects of their own. Most of these independent projects reside on their individual school's intranet, but a few have been published to the Web, such as Kim Fussell's Developing Tennessee Pride. One of the former students of our graduate program, Mrs. Stacey Valle, is now the webmaster for her school, Pin Oak Elementary School, in Lexington, Tennessee. Others continue to integrate technology into their classroom lessons on a regular basis.

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INSTRUCTIONAL STRATEGIES FOR ACHIEVING A POSITIVE IMPRESSION IN COMPUTER-MEDIATED COMMUNICATION (CMC) DISTANCE EDUCATION COURSES

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Abstract

With the rapid development of computer technology in recent years, distance education, and especially computer-mediated communication (CMC), have expanded very quickly. The application of computer technology in education presents many unanswered questions, including issues related to impression formation and impression management in computer-mediated environments. This paper reviews the knowledge base for verbal and nonverbal factors affecting impression formation in both face-to-face (FtF) and CMC environments. Based on this review, instructional strategies for achieving effective communication and a positive impression in CMC distance education courses are proposed.

Introduction

A growing body of research has consistently indicated that distance education technology has significant effects on instruction and administration (Phipps & Merisotis, 1999). There are two different formats of distance education: interactive television instruction (ITV) and Web-based instruction (WBI). Currently, the use of WBI tends to be increasing and almost every professional organization's publications and conferences have shown a substantial increase in the attention given to WBI and distance education

(Simonson, Smaldino, Albright, & Zvacek, 2000). While many aspects of distance education are being investigated, one area of central concern is computer-mediated communication. There is a growing body of evidence (Walther, 1992) that communication processes may be affected differently when students and teachers communicate via technology rather than directly in FtF environments. In particular, the attributions that students make and the impressions they form regarding their teachers and the instructional process may be constrained or promoted by the medium of communication. Particularly for students that are new to instruction via technology, these impressions may have much to do with their satisfaction and learning. Students' judgments about the teacher and the course often affect the efficacy of the instructional process, either positively or negatively. In most FtF classrooms, knowledgeable teachers can and do promote attributions by students that will facilitate the instructional process. However, there have not been many studies on strategies of impression management in CMC distance education courses, even though these types of distance education courses are becoming common. Therefore, this paper is intended to suggest strategies for instructors who wish to achieve positive impressions of both themselves and the instructional process in CMC distance education courses.

In the remainder of this paper, factors that affect impression formation in FtF environments and CMC environments will be identified and briefly described. After this description, recommendations for achieving positive impression formation in CMC distance education courses will be presented.

Literature Background

FtF Environments

Both nonverbal and verbal factors have been explored widely since they both influence people's impression formation in FtF environments. In particular, the influences of nonverbal factors have been more extensively studied than the influences of the verbal cues. According to Patterson (1994), nonverbal cues can be managed to achieve particular interpersonal goals, such as engaging other people. A review of the literature indicates that the influences of three major categories of nonverbal factors have been identified. These nonverbal factors are: (1) visible cues, (2) paralinguistic cues, and (3) psychological cues (Liu, 2000).

Visible nonverbal cues include facial expression (Ottatti, Terkildsen, & Hubbard, 1997), eye contact (Winkel & Vrij, 1990), touch (Burgoon & Walther, 1990), dress style (Vrij, 1997), and body posture (Burgoon & Walther, 1990), as well as physical appearance (Butler, Pryor, & Grieder, 1998) and ethnicity (Chia & Jih, 1994). Paralinguistic cues include continuously coded behaviors such as fundamental voice frequency, vocal intensity, speech duration, speech rate, pauses, and response latency (Street, 1990). Finally, psychological cues include a communicator's individualistic traits such as attention, attribution, mood, primacy effect, and recency effect.

While nonverbal cues have received considerable attention for their influence on impression formation in FtF environments, the influences of language variables on impression formation have not received enough attention until recently (Bradac & Street, 1989/90). The language cues primarily explored in recent literature have focused mainly on the following aspects (2000):

1. Language norms: Norm deviations or violations reduce the subject's perception of the norm violator's attractiveness and affect their ability to confidently predict and explain behavior (Berger, Gardner, Parks, Schulman, & Miller, 1976).
2. Standard discourse schemas: There are three standard classes of discourse schemas in the language: interpersonal schemas, rhetorical schemas, and narrative schemas. Interpersonal schemas refer to conventions for establishing interpersonal interactions between the communicators. Rhetorical schemas refer to conventions for laying out a reasoning sequence which the writer wants the reader to follow. Narrative schemas refer to conventions for connecting a sequence of language into a coherent text (Winograd, 1977).
3. Pragmatic and syntactic codes: There are two basic codes in communication: pragmatic and syntactic. The pragmatic code is verbally and theoretically associated with the oral communication style in which context and shared background are essential. The syntactic code is associated with a style that is less context driven, more explicit, and more differentiated. These two codes differ in a variety of ways. The pragmatic code is associated with high engagement, while the syntactic code is related to detachment or low engagement (Ellis, 1992).
4. Language intensity: Language intensity refers to whether a communicator's description of a concept deviates from neutrality. Language intensity is not only directly related to a receiver's attributions of internality to communicators, but also very much related to the features of the particular communication context (Bowers, 1963).
5. Verbal immediacy: Verbal immediacy refers to whether a communicator relates himself/herself to the topics of the message. Verbal immediacy affects a receiver's judgments of a communicator's positive affect and competence, as well as character (Bradac, Bowers, & Courtright, 1980).
6. Powerful vs. powerless styles: The powerless style is characterized by verbal hedges, intensifiers, hesitation forms, polite forms, and questioning intonations, while the powerful style is characterized by less frequent use of these features. Communicators using the powerless language style are not necessarily low in social status, social power, or competence, but may convey that impression due to the use of powerless language style (Haleta, 1996).
7. Verbal influence strategies: There are three different paradigms in persuasive communication: passive message reception paradigm, active participation paradigm, and resistance to persuasion paradigm. The active participation paradigm results in a change in the roles by both persuader and persuadee while the other two do not (Burgoon & Miller, 1985).
8. Ironic remarks: Ironic criticisms convey information distinct from information conveyed by literal criticism. Specifically, people use irony over literal language because of the following advantages: (a) to be funny in communication, (b) to

reduce the edge of an insult, (c) to show themselves in control of their emotions when encountering offensive behavior or poor performance, and (d) to avoid hurting their relationships with the receiver (Dews, Kaplan, & Winner, 1995).

CMC Environments

Recent research indicates that there have been two dominant research models in CMC: the task-oriented model and the social-emotion-oriented model (Liu & Ginther, 1999). Both of these models have distinct implications for impression formation. The most well established model is the Social Presence Theory proposed by Short, Williams, and Christie (1976). According to this model, since CMC users cannot see each other, the CMC environment is restricted in terms of nonverbal cues. Thus, CMC tends to be tasked-oriented, depersonalized, and prevents the development of interpersonal relationships between CMC users. Most prior CMC research tended to be consistent with the model of the task-oriented communication (Connolly, Jessup, & Valacich, 1990; Hiltz, Johnson, & Turoff, 1986).

However, contrary to the task-oriented model, Walther (1992) proposed the Social Information Processing Model to explain how interpersonal relationships can be established in CMC environments. Specifically, this model explains how CMC communicators process social information using various media in CMC and FtF environments, as well as the effects of such information on interpersonal communication. For instance, CMC users can adapt their verbally transmitted or textual messages to improve impressions formed by their partners in CMC environments (Walther, 1993; Walther & Burgoon, 1992). In addition, some studies have found that CMC communicators are involved in both task-oriented communication and social-emotion-oriented communication (Tangmanee, 1999).

CMC not only involves verbal cues, but also involves nonverbal cues that can be manipulated to develop interpersonal relationships among CMC users (Walther, 1992). This is also consistent with MacKinnon's (1995) view that one's social currency is primarily based on the information he/she manages and the wit he/she contributes to it rather than media richness. In addition, recent research has pointed out that language in CMC environments has characteristics of both oral and written language. Interactive written discourse (IWD) in CMC is a hybrid that exhibits characteristics of both oral and written language. Norms for IWD are gradually emerging (Ferrara, Brunner, & Whittemore, 1991). In addition, according to Murray (1988), the use of characteristics such as personal involvement, integration, and the like, is primarily determined by the specific context rather than by whether the communication is written or oral. Thus, recent studies have investigated how CMC communicators are involved in social-emotion-oriented communication (Jacobson, 1999; Lea & Spears, 1992; Utz, 2000; Walther, 1996; Walther & Tidwell, 1995; Walther & Burgoon, 1992).

Similar to FtF environments, impression development is an important topic in CMC (Walther, 1993). Therefore, there have recently been some studies investigating the effects of both verbal and nonverbal cues in CMC. Adkins and Brashers (1995) studied

the influences of powerful and powerless language styles on impression formation in decision-making CMC environments. Their results have indicated that a communicator using a powerful language style in CMC environments is perceived as more attractive, credible, and persuasive than the communicator using a powerless language style. Adkins and Brashers concluded that powerful and powerless language styles had a great influence on impression formation in CMC environments.

A few recent studies have identified the existence of certain nonverbal cues in CMC and have investigated their effects on social-emotion development. These nonverbal cues include temporal aspects (Hesse, Werner, & Altman, 1988) or chronemics--time of sending and receiving a message (Walther & Tidwell, 1995), primacy and recency effects (Rintel & Pittam, 1997), pictographs or typographic marks and emoticons (Asteroff, 1987; Reid, 1995; Thompsen & Foulger, 1996), as well as frequency and duration (Liu, 2000).

The first category of nonverbal cues is chronemics or temporal aspects of CMC. Hesse, Werner, and Altman (1988) proposed a transactional framework to study temporal aspects in CMC interaction. According to Hesse et al., temporal aspects of CMC involves four major aspects: temporal scale, sequencing, pace, and salience. In addition, according to Walther and Tidwell (1995), chronemics is a very important nonverbal cue and can be transferred via CMC. Variations in chronemic cues can affect a communicator's judgments about their intimacy/liking or dominance/submissiveness in CMC relational communication.

The second category of nonverbal cues includes primacy and recency effects. According to Rintel and Pittam (1997), in order to achieve a positive impression on the desired receivers, there are critical factors for initial impression formation in the opening stage in an Internet Relay Chat (IRC) environment. These include the choice of names such as nicknames, the use of orthographic exaggeration, extension, expansion, and paralinguistic marks such as smileys. Therefore, according to Rintel and Pittam, the opening and closing phases of IRC interactions are crucial for the initiation, development, and maintenance of interpersonal relationships. Moreover, in terms of the general functions of the strategies used, interaction management in synchronous CMC interactions is similar to that in casual group FtF interactions. However, the content, structure, and ordering of the strategies are subject to modification. Therefore, it can be inferred that interaction management in FtF may be applicable to synchronous CMC interaction. Specifically, a communicator may achieve a positive primacy impression in the opening stage and achieve a positive recency impression in the closing stage.

The third category of nonverbal cues in CMC includes paralinguistic cues, such as pictographs or typographic marks and emoticons. According to Lea and Spears (1992), paralanguage is not only available in FtF interaction, but also available in written communication, which takes the form of typographical marks and other characteristics of the text. Paralanguage does convey socially shared meanings although it has no lexical meaning. Therefore, reading paralinguistic cues not only facilitate the understanding of the transmitted message, but also help define the message style from which receivers may

infer certain impressions about the communicator's personality traits. For instance, the appearance of typing errors in a message may imply that the sender is in a hurry when composing the message. However, the repetitive appearance of typing errors in a series of messages may imply that the sender is careless and incompetent. Similarly, repetitive use of typographical marks may imply that the sender is a lively and spontaneous person. Therefore, many researchers have proposed using pictographs or typographic marks and emoticons in CMC interaction because these marks can convey social emotions and reduce perceptions of flaming (Asteroff, 1987; Reid, 1995; Thompsen & Foulger, 1996). Specifically, emoticons may convey facetiousness and may also convey sarcasm. In addition, Lea and Spears found that spontaneously generated paralinguistic marks were related to impression formation for both novice and experienced CMC communicators and that whether their interpretation was positive or not completely depended on the pre-established groups or individualistic context of the interaction.

The final category of nonverbal cues includes frequency and duration of messaging, as well as latency of response. According to Rice and Love (1987), frequency and duration of messaging are two major aspects related to the amount of CMC information communication. Frequency is similar to "latency of verbal response" (Willard & Strodtbeck, 1972) and refers to how quickly a communicator responds to begin a conversational turn. Duration is similar to the psychological trait of "duration of verbal response" (Koomen & Sagel, 1977) and refers to how long one communicates between conversational turns. A recent exploratory study (Liu, 2000) of the effects of frequency and duration of messaging on impression development in asynchronous CMC has indicated that duration and frequency had significant main effects on impression development. Specifically, this study suggests that frequency and duration of messaging are potentially important variables in CMC group communication; high frequency and long duration can help CMC users achieve a positive and competent impression from their CMC partners. The results of this study not only theoretically support Walther's Social Information Processing Model, but also lay foundations for further research in many popular types of interactive CMC environments, including e-commerce, e-health, and e-learning.

Strategies Of Achieving A Positive Impression In CMC Distance Education Courses

Based on the above review of research of impression formation in both FtF and CMC, many instructional recommendations for positive self-representation in CMC distance education courses can be proposed for the distance education instructor. These recommendations may be helpful in facilitating the interaction and relationship between the instructor and the students in both asynchronous and synchronous CMC. Some of the recommendations may be more helpful for asynchronous CMC while others may be more helpful for synchronous CMC. Specifically, these recommendations cover both verbal and nonverbal strategies.

First, verbal strategies:

1. Following language norms: CMC instructors should follow the emerging CMC language norms to express their attitudes and ideas. These include such norms as

greetings, information sequencing, reciprocity, and appropriate compliment giving. Otherwise, any norm violations will reduce the receiver's perceptions of the norm violator's attractiveness and affect their competence.

2. Using standard discourse schemas selectively: CMC instructors should select any of the three standard discourse schemas: interpersonal, rhetorical, and narrative schemas, in accordance with the nature of the topic being communicated. For instance, the interpersonal schemas are highly recommended for interpersonal communication (e. g., e-mail), especially for the frustrated/overwhelmed distant student.
3. Using pragmatic and syntactic codes selectively: CMC instructors should select any of the two basic codes: the pragmatic code or the syntactic code, in accordance with the nature of the topic being communicated. For instance, the syntactic code is highly recommended for task-oriented assignments, while the pragmatic code for emotion-oriented tasks.
4. Using intense language: CMC instructors should use appropriately intense language, such as strongly worded messages, to express their attitudes toward the topic being communicated. This will be especially helpful when the students are not sure about the topics/messages.
5. Using immediate language: CMC instructors should use strongly immediate language to express their attitudes toward the topic being communicated. The more immediate the language, the more positive the receiver's judgments of a communicator's competence, affect, and character. For instance, "We'll certainly enjoy this chapter" is more immediate than "You and I certainly will enjoy this chapter."
6. Using diverse language: CMC instructors should use a wide range of vocabulary to express their attitudes toward the topic being communicated. The wider the range of vocabulary, the more positive the receiver's judgments of a communicator's competence, SES, and message effectiveness. For instance, a variety of terms are used to refer to distance education, such as distance learning, teleconferencing, online learning, virtual learning, web-based instruction....
7. Using powerful language style: CMC instructors should use powerful language style to express their attitudes toward the topics being communicated. Specifically, their language style should not include such features as the use of hedges, hesitations, intensifiers, tag questions, and the like. For instance, when instructors want to communicate something important, they should use a powerful language style to achieve a positive impression from their students and influence their subsequent learning behaviors.
8. Selecting the appropriate verbal influence strategy: CMC instructors should select the appropriate verbal influence language when being involved in disagreements and/or persuasive learning tasks. In most cases, the active participation paradigm is highly recommended. Influence language should focus on reciprocity rather than being compensatory between students and instructors. In addition, CMC instructors should adapt their message content appropriately to fit their students' needs by understanding the latter's characteristics and perspectives.
9. Using appropriate ironic remarks: CMC instructors might very selectively use appropriate ironic remarks rather than literal paraphrase or criticism in some

special situations. In this way, instructors can eliminate potential insults and show greater control of their emotions if they are attacked or offended by students. This may be very important in the open public bulletin boards/forums. For instance, instructors might use ironic remarks rather then literal criticism to reduce a student's emotional frustrations when the latter involves poor performance or involves an inappropriate posting in the bulletin board.

Second, nonverbal strategies:

1. Using paralinguistic cues such as emoticons appropriately: CMC instructors can use paralinguistic cues such as emoticons appropriately to express their attitudes toward the topic being communicated. Most emoticons or smileys (e. g., ":-)", "J", ":-(", "L") are composed of keyboard symbols. Some are extremely simple and others are highly complex. Usually, an instructor's appropriate use of emoticons can give students a positive impression of a more vivid, dynamic, and graphic description of their feelings and actions than of a traditional textual description.
2. Taking into account chronemics: CMC instructors should take into account chronemics since it is a very important nonverbal cue in CMC environments. Chronemics may have important implications for CMC communications between different locations and/or different time zones. This may avoid misattribution, misunderstanding, and frustrations. For instance, emotion-oriented messages are recommended to be sent at night, while task-oriented messages in the day.
3. Maintaining a high frequency of messaging: CMC instructors should maintain a high frequency of messaging to express their attitudes toward the topic being communicated. For instance, instructors may maintain a high frequency of messaging to lead and facilitate the discussion in the bulletin boards/forums.
4. Maintaining longer duration messages: CMC instructors should maintain longer duration messages to express their attitudes toward the topic being communicated. For instance, instructors may present more extensive and complete messages to lead the discussion and describe thoroughly the topic being discussed.
5. Maintaining a fast reply of messaging: CMC instructors should maintain a fast reply of messaging to answer students' questions or concerns via a variety of ways, such as e-mail, voice-mail, bulletin boards/forums, and online chat. Doing so will help establish the student's confidence in the course and the instructor, as well as reducing students' frustrations.
6. Manipulating primacy effect: In online chats, CMC instructors should try to achieve a positive primacy effect in the opening stage, by saying "hello" to every member, or through the appropriate use of nick name, orthographic exaggeration, or smileys.
7. Manipulating recency effect. In online chat, CMC instructors should try to achieve a positive recency effect in the closing stage, by saying "Bye...." and simply exiting CMC interaction completely.
8. Ensuring no typing errors. CMC instructors should ensure that there are no consistent typing or spelling errors in the messages. Otherwise, the repetitive typing errors may convey the impression that the communicator is careless and

incompetent. Moreover, typing errors may cause misunderstanding. Thus, it is highly recommended to always check spelling in asynchronous CMC if possible.

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INTERACTIVE LEARNING THROUGH CREATION AND USE OF A CYBER CORPORATION WITH APPLICATION IN PUBLIC RELATIONS, BUSINESS, AND FINANCE

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Abstract:
This paper is a case study that discusses the creation of a virtual corporation for use in teaching public relations techniques. It also shows how the structure can be modified for teaching business or finance. A description is given on how to construct and use similar web pages. The components are described and their use illustrated. A discussion is also included on the advantages and disadvantages of using a web in classroom instruction.

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Background
The University of Tennessee at Martin (UTM) is a campus comprised of about 6,000 students. It is part of the University of Tennessee System and is located in West Tennessee in Martin; which is a town of about 10,000 persons. Although the town is very supportive of the University, it does not have a large commercial sector. The largest commercial employers are Goodyear, Tyson, and MTD who have facilities located within a 20-mile radius of Martin. However, the remainder of the industrial base is comprised of small light-production facilities. The economy of the area is largely agricultural.

This community profile makes the teaching of public relations and relating it to practical application particularly challenging, since typical public relations jobs are more closely aligned with metropolitan and commercial endeavors. Forty percent of public relations jobs are found within the corporate structure and another 27 percent of the jobs are found within public relations or marketing firms (Becker, *et al*, 1999). However, UTM does have advantages relative to Internet access availability for students and staff. The campus was one of the first in the state of Tennessee to have all of its buildings including all dormitories wired with fiber optics. Persons working in any of the buildings or living in any of the housing complexes have free Internet access. Availability of this access, linkage to corporate sites, and construction of a virtual corporation would assist in creating a public relations teaching scenario at parity with opportunities available in larger metropolitan centers.

Introduction

The dominant leaning paradigm of the past and the one that is most frequently encountered today is the one of information transfer. Even when computer technology has been introduced, most often the courses have continued to follow the information transfer paradigm (Bork, 2000). The teacher has been seen as the authority figure and the source of all knowledge. Although some elements of that paradigm exist in the approach taken using the virtual corporation described in this paper, using the virtual corporation as a teaching tool, the teacher becomes more of a guide within the framework of a tutorial teaching paradigm.

Design

Although some persons prefer to design their web documents through line by line writing of hypertext markup language (HTML) and scripting; increasingly people are turning to editing programs because they are easy to use and do not require an extensive knowledge of html. Common examples of these types of programs are FrontPage 2000; DreamWeaver, PageMill, and Hotdog. The author used FrontPage 2000 to design the virtual corporation described in this paper. The program is very easy to use and the tutorial allows even the novice to quickly design pages that will work for almost any classroom application. The web address (url) for the virtual corporation in this case study is http://www.utm.edu/~jhoyer/.

A menu to link design was used for construction of the virtual corporation with the homepage being linked to the remaining support pages and the support pages being linked to each other and the home page. The homepage is designed with college students being the niche audience and as such, some of the interactive elements are chosen based on what would appeal to that audience. The Homepage provides a brief introduction to the web elements by describing what is on the supporting pages and also how to use the web. The support pages include a "How to" page, a Projects page, a photo archive and another page which contains summary narratives of new contracts being won and products being developed within the company.

The "How to" page lists various types of documents which will be generated in the class. The page includes links to cookbook style sheets for each type of document and which describe the format, the use and key points in creating the specific type of document. Additionally, links are provided to examples that have been created and made available to the student and in many cases to actual documents on the web that have been placed on display by various corporations.

The projects page contains descriptions of the various contracts being performed by the virtual corporation. Each profile also contains quotes from personnel and various level managers. The quotes are made available so the student can integrate them into press or product releases, brochures, or any other type of document where a quote or testimonial would be considered appropriate.

The photo archive contains jpegs relating to each of the contracts. The photos can be copied and pasted by the students into news releases, newsletters, product promotional material, an annual report, or any variety of documents the student may construct.

The "What's Happening Around Cyber Corp" page contains narratives about new contracts recently won by the company, new product release information, and in some cases descriptions of awards the company is receiving or giving.

The profile chosen for the virtual corporation was that of an engineering project management company comprised of three divisions: Construction and Maintenance. Commercial and Environmental. The profile was selected because it allows diversity so that students can be exposed to a variety of areas where they are challenged as they work their way through the company to glean the information to complete course assignments. Additionally, such diversity also allows the author to add new contracts throughout the duration of the course in a variety of ways to stimulate student participation and make the experience as close to working within a corporate structure as possible. Contract descriptions themselves came from the author's composite experience of 20 years working for one small business and two major corporations as a proposal manager and senior technical writer. Since the descriptions are composites of several real contracts, they retain the reality required to ensure that the student is exposed to real-world experiences and yet they do not compromise contracts and corporate relationships that actually do exist.

Use

Although a textbook serves as the basis for discussion of course-related elements and for teaching basic public relations writing techniques, what is taught in lecture is actually implemented through assignments related to the virtual corporation. The paragraphs that follow describe the approach that the author has taken in using Cyber CorpÓ, the virtual corporation, to teach public relations writing. Additionally, paragraphs are included which describe what could be done with the virtual corporation to also make it usable to the areas of business and finance.

Public Relations

Beginning with the first class period, the students are introduced to Cyber Corp. They are told that it is an engineering and project management firm that has a corporate headquarters and operates projects in seven states, the Philippines, and the Marshall Islands. In its seven-year existence it has grown in annual revenue from $150,000 to a current contract backlog of $40 million placing it on the INC 500 list of fastest growing companies in the United States. However, the company does not have an internal public affairs department and they have been hired to generate the documents that will ensure the Company continues its healthy growth trend. The students are then shown the homepage of the virtual corporation and an explanation is given on how to use the "How to" section which explains characteristics of the various assignments they will be given and which provides samples of each document to be generated. The students are then given a "tour" of the Cyber CorpÓ and shown the layout and contents so that they will be able to draw from the project descriptions, photo archive and development area to

assimilate the information needed to function as they would within a real internal communications department in a corporation. The initial assignment makes them familiarize themselves with the scope of the Company's activities and design a logo that is used throughout the documentation designed for the Company. During a typical semester, based on the virtual corporation, students write and design the following: a persuasive business letter, a biosketch, a backgrounder, a brochure, news releases, flyers/posters, table toppers, public service announcements, a position paper, an action plan, and the narrative for an annual report.

As the class members progress through the syllabus, they are repeatedly asked to go back into the virtual corporation and based on cyber surfing and "interviews" construct the various documents that are typically generated in a corporate environment.

Finance

The structural design of the virtual corporation as developed earlier in this paper has applicability in the area of finance by adding a few components to create opportunities for costing and spreadsheet maintenance. If the Corporation was being used in the area of finance, the instructor could have the students prepare bid proposals based on the contract scope. By adding material lists, and Department of labor categories and rates, and corporate factors such as overhead, the students could use programs such as Excel or Lotus to cost out individual contracts. Since the contracts vary in size from a few thousand dollars to several million, the instructor could begin with simple "problems" and progress to more difficult ones. The instructor could even make it more challenging by providing only the "core" information from the contracts, and have the individual students make the phone calls needed to carry out item analysis for various components. That would involve students in contacting suppliers and being involved in the financial end of the bid process just as it is carried out in the real world. Additionally, the students could work individually or on teams to compete in identifying ways to cost items more competitively and beat out the competition to win the contract. This approach would not only involve the students actively in learning, it would prepare them to not only know the principles of accounting, but how these principles are applied in day-to-day business.

Business

Since the virtual company is a fairly new start up, a person teaching business could involve the students in developing a 5-year or 10-year business plan (you would have to modify some information here since the company is seven years old in cyber space anyway). Students could also work together to explore ways to expand the current divisions or integrate new ones. They could design capabilities documents for potential clients or investors. The instructor could provide scenarios in which the students would have to present the company's assets to investors or potential clients through PowerPoint presentations. This would involve design of charts and other presentation materials. The instructor could have the students act as marketing teams pitching their ideas in a meeting setting. This would develop the oral presentation skills that are commonly used in this field. In all scenarios, the backdrop for the information could be the corporate profile that exists in Cyber Corp.

Advantages and Disadvantages

There are several advantages to using the virtual corporation in teaching public relations techniques. The same advantages would also apply in most cases in using the virtual corporation in teaching business and finance. Research has shown that instruction via computers results in longer retention of material and in higher test scores compared to the conventional methods (Beerman, 1996). Bork *et al.* (2000) note that computer-based learning is much more individualized, interactive, and accessible for most students. These authors note that students are able to learn at their own pace wherever they are when the teaching is computer based. Another researcher suggests that Internet technologies sharpen knowledge management and collaborative learning skills among students and helps them in problem solving and decision-making (Bates, 2000).

The author of the case study in this paper notes a marked improvement in the quality of work handed in by his students carrying out assignments using the virtual corporation as a basis for assignments compared to similar assignments received from students in classes where situational descriptions were used from a textbook rather than the virtual corporation. Additionally, the students appear to identify more personally with the assignments, express a greater interest in evaluation of their work, and assume more responsibility for correcting any errors before delivering their products for the final critique. Another advantage that exists because of the background described in this paper, is that students at a university in a rural setting are able to experience the internal dynamics of working within a large corporate structure that may not exist in their community and because of that they are better prepared to enter the job market and make the transition successfully once they have completed their training.

There are few disadvantages associated with use of the approach described in this paper when used to support a classroom approach to education. Some authors, however, have identified some disadvantages for students using the Internet solely as a teaching approach without the classroom to support the teaching. These do not relate so much to learning of the content, but to lack of socialization or feelings of isolation (Bork, *et al.*, 2000).

Summary

The use of a virtual corporation for the teaching of public relations techniques can provide an enhanced learning opportunity for students and better prepare them for entry into the real world market place. It may also hold potential for use in the teaching of business and finance. Research supports inclusion of this approach as one way to improve learning. Additionally, with new development tools being made available each day, construction of such teaching devices is within the reach of most educators including those without a highly technical background.

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Introducing Novice Computer Users to Lesson Plan Development through WebQuests

A presentation made at the
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Abstract: Novice computer users learned how to cut and paste, create links, and insert graphics and background in a collaborative environment. Preservice teachers also had the opportunity via the WebQuest template of designing an interactive lesson plan. While the students were free to explore resources within their own particular area of interest and certification, instruction and guidance was provided for a structured evaluation of websites that might be included in their web-based lesson plan.

In early 1995, Dr. Bernie Dodge, Professor of Educational Technology at San Diego State University, and his graduate assistant, Tom March, developed a model that would use learners' time well, focus on using information rather than looking for it, and support learners' thinking at the levels of analysis, synthesis and evaluation. WebQuests, as defined by Dr. Bernie Dodge (1997), are "an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the internet, optionally supplemented with videoconferencing".

Their WebQuest model is outlined in Some Thoughts About WebQuests. Over the years, many pre-service and in-service teachers have implemented Dodge's WebQuests as an interactive means of engaging student learning. The Freed-Hardeman University EDU 506 graduate students have created "Short-Term WebQuests" whose instructional goals are "knowledge acquisition and integration, described as Dimension 2 in Marzano's (1992) Dimensions of Thinking model." At the end of these short-term WebQuests, the students have "grappled with a significant amount of new information and made sense of it." (See "Some Thoughts About WebQuests" [Dodge, 1997] for more information.)

The graduate students' WebQuests are deliberately designed to make the best use of a student's time. They are written for a single discipline for immediate use within the teachers' classrooms. The WebQuest project focuses the creators on tangible and

hi-tech tasks, gives them an audience to create for, and opens up the possibility of getting feedback from that distant Web audience via an embedded e-mail link. They are hosted on the FHU School of Education web server.

Before launching into WebQuests, our students spent time with Project Two -- Finding Information on the World Wide Web. Since the Web is not indexed in any standard manner, finding information can seem difficult, particularly for novice users, even if they happen to be experienced teachers. Without a clear search strategy, the student may find that using a search engine is often like wandering aimlessly in the stacks of a library trying to find a particular book. A "Finding It Online" Tutorial was made available for those who self-assessed their Internet skills as seriously lacking. "Regular" search engines such as Yahoo, Excite, and Google were demonstrated and utilized in organized searches and then compared and contrasted with metasearch engines, such as Ixquick, Mamma, and Dogpile. As a concluding exercise, an Internet Scavenger Hunt was independently accomplished and critiqued. This provided the graduate students with some personal experience and insight into using the Internet.

Our classes began to integrate the Internet for learning by collecting sites that they found most useful, interesting, and interactive on their chosen topic. Since many projects have already been done, students were required to select either a new topic or to revise an existing WebQuest in a different direction. Their searches on the web save their students, and others who will use their project, hours of aimless surfing. While the students were certainly encouraged to collect the Internet locations on paper, they were instructed to set up folders were set up in Netscape Navigator and to bookmark their favorite sites. Recognizing that this would be specific for a particular machine, the students used the same computer each class session. Bookmarks for Education were provided as a starting point for the class. A searchable database of bookmarks was also made available at iKeepBookmarks.com.

The instructor also provided links to a variety of Webpage Construction Resources on the bookmarks lists. The resources by category on the list include: Backgrounds; Dividers & Bars; Graphics & Clip Art; and WebPage Design and Evaluation hotlinks. Our students' creations are richer and more sophisticated because of resources that may never have been available in their classrooms before. This is also the time and place to educate students on copyright and fair use policies. These webpage construction resources offer an open, student-centered approach that encourages meaningful construction of meaning.

Critical issues to be resolved involved questions about the topic selected and the web links that were bookmarked. The topic selected needed to be original. With many WebQuest projects already done by previous students in EDU 506, a thorough examination of the database of existing projects lead to a class discussion of the meaningfulness to the curriculum of the anticipated topic of choice. Since our students come from all over West Tennessee and even some from surrounding states, curriculum guides from many places, available through our Instructional Resources Center, were consulted as necessary. There also needed to be a genuine enthusiasm for the topic and outcomes for excitement within the person designing the WebQuest. The topic needed to

have available resources on the net that were of sufficient quality and interactivity that could not be found in traditional classroom textbooks. While the questions and tasks proposed in the WebQuest were directed toward inquiry-learning, the project needed to be more that just simply another class work or homework assignment. The tasks were phrased in such a way as to evoke higher-level, transformational thinking in the minds of the learners targeted by the WebQuest.

With the author's instruction and further guidance by graduate assistants, novice computer users learned to cut and paste, to create links, to insert graphics and background, and to use more than one application at a time in a collaborative environment. Pre-service teachers and graduate students working on initial certification also had the opportunity via the WebQuest template of designing an interactive lesson plan. While the students were free to explore resources within their own particular area of interest and certification, instruction and guidance was provided as to effective evaluation of websites that might be included in their webpage.

The WebQuest Project is an inquiry-oriented activity in which most or all of the information used by learners is drawn from the Web. Using Netscape Composer, students and teachers have been guided through the process of creating a short-term, single discipline WebQuest. In particular, the EDU506 Computer Applications in Education graduate students have designed web pages that could be used immediately in their classrooms. These samples are available for viewing and comment, and thorough instructions for creating one's own interactive web pages for students and parents are provided.

This author has used a revised version of Dodge's WebQuests template as a teaching tool for lesson plan creation with undergraduate and graduate education students, some of whom had little or no computer experience. Although other avenues are available to accomplish the same ends, such as MS Word, MS FrontPage, and MS Internet Explorer, the Netscape Communicator 4.x suite offers an integrated package that has a low learning curve. One of the items available as part of Netscape Communicator's package is Composer, an HTML/webpage creation application.

The reaction of the students has been overwhelmingly enthusiastic. Some of the more experienced computer users have been teamed with the novices, but both are required to work on an independent project. The projects are demonstrated for the entire class with evaluative comments made by both their peers and the instructor. The web pages were also evaluated for lesson plan content and technical and aesthetic qualities. All of these aspects were tied together in interactive web pages that were then edited by the webmaster and uploaded onto the School of Education's server for viewing on the World Wide Web. This enables the teachers and their students to access the WebQuest from any connected computer, and other teachers at their grade level or subject-matter discipline across the world to have access to their learning experiences.

WebQuests for EDU 506 target specific learning, rather than merely sending students to Web sites hoping they will find something useful there. Each part of The Process requires

the students to go directly to a particular site and do a specific task. Seldom is the student given the option or freedom to get lost in the vast wilderness of the Internet. These compelling experiences foster the attitudes, knowledge, and skills that are the central learning goals of the WebQuest. One of the reasons why the information on the Internet is so valuable is because it offers a breadth of perspectives and viewpoints that are usually not available in traditional classroom textbooks. Students working through the WebQuest benefit from being linked to a wide variety of Web resources so that they can explore and make sense of the issues involved in the challenge. (See Tom March's "Working the Web for Education" for a more detailed analysis.)

As more students have created WebQuest activities, we are building a database of high-quality activities available for use by teachers and students around the world. We have recently begun using SiteAdd.com as a free and easy way to register our sites with the top search engines. In this way, we are hope that many more educators will use our sites for learning activities for their students and that others will use our projects for models to inspire their own creativity. An evaluation checklist is used to assess technical competence of the project, and the demonstration of the project in front of peers before posting to the Internet allows the creators to tweak the WebQuest. Therefore, we expect the activities created by our EDU 506 students to be among the best on the Web. Educators who use web-enhanced delivery of lessons tend to be highly-motivated people who thrive on creativity and enjoy learning. By sharing what we have created on the Internet, we also appreciate the feedback that comes from other professionals who have viewed and used our pages. Our class fosters a supportive and professional feedback loop so that we can all create the best learning experiences for our students.

Some of our students have gone on to complete additional WebQuests of their own. Most of these independent projects reside on their individual school's intranet, but a few have been published to the Web, such as Kim Fussell's Developing Tennessee Pride. One of the former students of our graduate program, Mrs. Stacey Valle, is now the webmaster for her school, Pin Oak Elementary School, in Lexington, Tennessee. Others continue to integrate technology into their classroom lessons on a regular basis.

A presentation made at the Sixth Annual Mid-South Instructional Technology Conference hosted by Middle Tennessee State University, Murfreesboro, Tennessee, on April 10, 2001, by Dr. Bruce Lewis, Assistant Professor of Instructional Technology at the School of Education at Freed-Hardeman University, Henderson, Tennessee.

A Journey in Virtual Collaboration: Facilitating Computer-Mediated Communication Among Pre-Service Teachers

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Abstract
Last year, three university instructors embarked on a journey to facilitate computer-mediated communication between three teacher-training courses in Indiana and North Carolina. For this project, we utilized AltaVista Forum, now SiteScape Forum, a web-based discussion forum. In this paper, we will share our experiences and offer guidance for those brave enough to undertake the endeavor of virtual collaboration. Main discussion points will include development of a meaningful project, the importance of modeling behavior, training students on collaboration skills, assessment issues and anticipating problem areas.

Introduction
Many educators are realizing the educational value of using the World Wide Web in education. Specifically, educators are finding the value of using the Web for facilitating collaborative groups. According to Harasim, Calvert and Greeneboer (1997) who discuss web-based collaborative learning "the conversations (verbalizing), multiple perspectives (cognitive restructuring), and arguments (conceptual conflict resolution) that arise in

cooperative groups may explain why collaborative groups facilitate greater cognitive development than the same individuals achieve when working alone." Educators are able to provide their students with richer learning experiences by the use of online collaborative projects using Web-based conferencing systems.

Our goal for this project was to create a learning environment that would operate as a catalyst to promote student collaboration regarding complex issues associated with using computers in educational environments.

Setting

Three classes were involved in the collaborative project. Two were undergraduate courses at different campuses of Indiana University, Bloomington and Northwest, and one was a graduate course at North Carolina A & T. Critical to the project was our realization that these sections were comprised of very different student populations.

The Bloomington class was composed primarily of freshman, traditional 18-22 year-olds living on campus and taking their first course in the School of Education. The Northwest campus is a commuter campus, located in Gary, Indiana. This class consisted of undergraduate students enrolled in a night class, many of whom had full-time jobs and families. Interestingly, several older adults withdrew from the course in the first few weeks. Those students who remained were undergraduates ranging in age from 18 to 30. The class at North Carolina A&T also consisted of many students who had full-time jobs and families, however the students were graduate students, ranging in age from their 20s to their 50s.

Another challenge associated with the different sections was the number of times the classes met per week. The Bloomington class met three mornings a week. The North Carolina A & T course met twice weekly. The Northwest course met only once a week in the evening. Additionally, while all three classes had equal Internet access during class, most of the Bloomington students lived in residence halls with high-speed Internet access outside of class time. The NCAT students also had more frequent access to Internet-connected computers than did the Northwest students.

These differences in class meetings and Internet access created disparity in the amount of posting done by students in the various classes. The instructors addressed these issues as a group. We found that we had to adjust our initial schedule and extend the online discussion time frame in order to accommodate the different class meeting times. This was done to allow students, who had limited access to the WWW, opportunities to contribute to the conversations before and after class-time when they had access to the university computer lab.

We believe that the relationship we had prior to the project was a big bonus in our ability to collaborate well together. All had been on the IU-Bloomington campus together the previous year teaching a similar course as colleagues. These prior relationships allowed us to communicate freely, openly and honestly.

Project

The objective was to create a project in which our students engaged in meaningful, virtual interactions through the discussion of computer-related topics in education. The method used to design and develop this project is discussed in detail in "Creating a Pre-Service Teachers' Virtual Space: Issues in Design and Development of Cross-Country Collaborations" (Reinhart, Anderson, & Slowinski, 2000).

We agreed to facilitate student interactions by placing the project in a more authentic context: a problem-based learning environment. Students were asked to envision themselves as part of a professional organization of teachers, in which they shared the knowledge they gathered about using technology in the classroom.

Over the course of the semester, students worked in groups comprised of individuals from each campus. They were asked to read articles related to five areas of educational technology: equity, acceptable use, software evaluation, technology funding, and integrating technology. Each member of a group was given a different article to read, and was entrusted with the responsibility of summarizing the content for his or her group mates. For example, during the acceptable use unit, students read and summarized articles on copyright laws, Internet filtering, acceptable use policies, and plagiarism. After completion of the summaries for each unit, the group collaborated to develop a shared statement on a question related to that issue. This statement was intended to capture the issues from each article, along with the group's own sentiment. To accomplish this, students collaborated via e-mail and an asynchronous Web-based communication tool.

Fostering collaboration

Because we had such diverse student groups, teaching the students how to work as a group became even more critical than usual. We realized quickly that we could not make any assumptions about the students having prior experience with group projects, especially with conducting group projects in an asynchronous manner with other group members physically distant from each other. Not only does working in a group require a unique set of tools and protocols, but working in an online group adds to the complexity of the group work process (McDonald and Gibson, 1998).

We began the project by having instructors train their local class on how to collaborate online. We emphasized the need for the students to not wait until the last minute to begin on their synthesis statement, since it was difficult to get all the group members to consensus without having a few days to communicate. Next, we each made sure our students were aware of rules of communicating online, specifically addressing netiquette issues. We also discussed the need for each group to establish their own set of rules and group norms to create their working environment. We gave them some recommendations, such as naming a facilitator for each assignment, but ultimately left the decisions up to each group as to how they would operate.

Finally, a big challenge was to make sure the students were providing each other with constructive criticism and useful feedback on their summaries. As noted by Hall and Hall

(1991), who conducted a similar project, the students first defaulted to uninspired comments, focusing often on spelling errors and grammatical problems, rather than addressing larger issues such as coherence and fluidity of discussion points. While none of us were trained as composition instructors, we did find the need to urge students to look more deeply at each other's work and provide more substance in their remarks to each other. In addition, we posted examples of quality student work on our course web site in an effort to demonstrate well-articulated discussion.

We soon learned the need to model good communication methods for the students. The project was a test of our own ability to collaborate via a distance. In addition to monitoring the students' SiteScape Forum discussions, we also asked the students to carbon copy the instructors on all their group e-mail messages. This request gave us an opportunity to watch how the groups talked to each other, and to identify potential problems before they got out of hand. Most of the communication between the groups and the instructors were done via E-mail. However, we did find that many students asked questions/advice of their local instructors before or after class-time regarding this project. Then, depending on the question, the students would relay a summary of the face-to-face conversation electronically to their group mates. Therefore, some of the modeling was done in a traditional face-to-face conversation.

The instructors communicated with each other mainly via e-mail, though we did make a few conference calls during the semester. Again, while most of the communication was done electronically we still found the need to use non-text-based methods to communicate. In fact, at the formation stages of the project, where we did most of the extensive planning, we chose to conduct business via conference calls.

SiteScape Forum

SiteScape Forum (formerly AltaVista Forum) was chosen as the asynchronous web-based discussion forum that we would use for this project. SiteScape Forum offered a variety of functions. For example, students could engage in a threaded discussion, submit documents, and respond to polls. This tool was selected primarily because all three instructors had previously used it as students, and it was already available to one of the instructors at IU-Bloomington as part of a site license. She was able to include the students and instructors from the other sites in her forum.

The benefit of using a web-based discussion tool is that students could take part in the conversations anywhere that they had an Internet connection and web browser. Students had time to think about their responses and formulate a more in-depth answer than they would be likely to give in a classroom discussion.

Additionally, for some students, the use of the discussion forum provided them an opportunity to speak out more than they would ever have attempted during a "live" conversation. Many students are simply more comfortable expressing their opinions in this setting, considering it a safer environment.

Assessment

Evaluating the students' efforts turned out to be one of the most time-consuming aspects of the project. As with most group projects, one of the main concerns on the part of the students was that some of them would be doing the majority of the work while others earned equal credit for less work. Aware of this when designing the project, we determined that students would be held responsible for both individual and group contributions.

First, we allowed the students to rate each other on group participation. We created a web-based peer review form that students were expected to complete after each assignment. They rated themselves as well as their teammates on a scale of 1 to 4, and gave comments about each team member. The students were allowed to see the comments that were not attributed to a particular teammate. Each student's participation grade was the average of their self-score and their teammate's scores. In order to manage these scores, one of the instructors developed a spreadsheet for averaging the peer reviews. The instructors then took turns collecting the peer review scores and comments.

Second, a portion of each student's grade was determined by his or her own instructor and was based on the individual article summary. Finally, each group was assigned a group grade on their synthesis position statement. This portion of their grade was the same for each student in the group. The three instructors rotated the responsibility for grading the synthesis statements.

We recommend the use of rubrics for grading both the individual and the group synthesis statements. The rational for this is three-fold, first rubrics help instructors guide their instruction (Popham, 2000). When there are multiple instructors, such as with this project, it is important that the each instructor has a clear understanding of the criterion on which the students will be evaluated. This helps to better coach or guide the students. Second, rubrics themselves can be instructionally illuminating (Popham, 2000). When students have access to the grading rubrics they will use the rubrics to self-evaluate their work. Thus, the rubric is used as an instructional tool to help students, many of who are new to this type of collaboration, and who need the extra guidance. Finally, rubrics help with consistent and objective scoring. This is important when multiple graders are evaluating student work.

The three grades (participation, individual summary, group statement) were added together to create a total grade for each assignment. A great deal of record keeping was necessary for this grading system. Careful planning and diligence are key to the successful assessment of the students.

Also, we recommend that each instructor make the project worth approximately the same percentage of their students' final averages. Otherwise, the group of students for whom the project is most heavily weighted will feel more responsibility for the project than the others.

Flexibility

We found it important to remain flexible throughout the project. From a collegial frame of reference, our personal and professional rapport was a critical factor. Due to this relationship, we were able to recommend and adjust quickly to make the project a success. There were times that it was necessary to adjust deadlines because of different student holidays, for instance. Additionally, we significantly altered the final stages of the project based on numerous concerns with the amount of work and the time necessary for that level of collaboration. Finally, we also switched group members around once. One group was not working – only one group member completed any work, and could not be expected to read four articles just so she could write a group summary. Therefore, we divided the team up and placed them all into other groups.

Student Feedback

In order to improve future iterations of the project, we wanted to get input from the students on how they felt the project was going. One instructor placed an anonymous feedback form on the web so that students could, at any point in the project, share their perceptions about the project with the instructors. Additionally, one instructor conducted individual interviews with her students midway through the project. This information was used in making decisions about the final stage of the project.

Conclusion

In conclusion, we would like to offer some advice for those interested in online communication and collaboration.

Collegial Rapport – An essential component of our project was our personal relationship. Without this strong trusting rapport, our project would not have been successful. Accordingly, before the planning phase, spend some time getting to know your potential colleagues. Or, as we did, choose collaborators that you have a professional relationship with.

Time - It takes a considerable amount of time, planning and effort in order to make cross-country collaborations work. The time and effort are ultimately worth it when the outcomes are meaningful conversations between diverse students who are sharing, learning and intellectually growing with each other. Consequently, prior to beginning, plan to spend the previous semester planning for the implementation of such a project. In addition to planning the logistics of the project, also consider the process of how you will make the inevitable but necessary changes as the project is underway.

Feedback – Due to the novelty of web-based collaboration, feedback becomes increasingly important for students. Provide rubrics as well as examples of student work that conforms to your rubrics. This will help students as they develop new skills in non-face-to-face communication.

Modeling – An effective component of online collaboration is the integration of techniques by the instructor. The best method is to model what you want student to do.

This will require an extensive online presence with frequent interactions with students (i.e., we recommend daily interactions with students).

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DEVELOPING PROGRAM RELATIONSHIPS WITH RURAL PUBLIC SCHOOLS FOR ELECTRONIC COURSE DELIVERY

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ABSTRACT:
As the benefits of electronic learning extend into the K-12 learning environment, the ability and value of higher education institutions to develop effective relationships with public schools become more important. Distance or electronic learning offers rewarding learning opportunities and electronic delivery solutions to achieve program goals in both higher education and the public school system, especially in rural K-12 settings. This paper and the presentation from which it is derived provides a case study in the development of the relationship between Louisiana Tech University and rural K-12 public schools in northern Louisiana.

The key to developing relationships between rural K-12 public schools and higher education in electronic course delivery is basic collaboration and communication. The ability to articulate issues and program ideas, unique to each educational entity, is critical to successfully networking through obstacles and toward mutual program objectives. However, in working toward program objectives, higher education institutions are no more adept at wading through the multi-layer local issues in public schools than those existing with peer higher-ed institutions. Conversely, rural public schools are unfamiliar with the policies and accountability-oriented programs found in higher education and electronic learning. To integrate electronic delivery into the educational process, both higher education and public schools must embrace change and think "beyond the box". Changing education is in itself "education", but it is a slow process. Changing how people think about the classroom, what they do in the classroom and how they do it...requires changing the traditional mind set of the average educator. Each must learn to think beyond the traditional image of the public school or college classroom, if they expect to expand programming by delivering courses electronically. Public schools must recognize the benefits of collaborating with higher education in offering students and

faculty access to resources available at universities via electronic delivery.

In Louisiana, officials at the highest levels of authority at the Board of Regents stress the value of a "seamless" educational experience for Louisiana citizens. A learning environment where K-16 educators and students share educational goals to not only matriculate in Louisiana, but have opportunities to pursue lifelong learning. The State of Louisiana is developing an educational environment in which higher-ed institutions and K-12 collaborate effectively in sharing resources and developing faculty talents, while improving the quality of public education. It is a mutual effort that benefits post-secondary education by encouraging the learner to stay in Louisiana. With its renewed emphasis on public education, the state expects a return on its investment of resources in electronic learning through improved student retention and graduation rates, as well as overall economic and workforce development. As a result, state citizens become empowered to improve their own quality of life.

Once provided technical resources, secondary and post-secondary systems will recognize the innovative educational and teaching opportunities available outside the traditional classroom. Each level of public education will realize that they share common goals and issues in improving education in Louisiana. By combining resources to meet the new challenges and opportunities in education, electronic delivery can have a positive impact on learning outcomes, whether the learner pursues higher education or vocational technical education. Electronic or e.learning helps educators in secondary and post-secondary to improve teaching skills in the traditional and non-traditional classroom settings, while serving as a valuable professional development tool. Since 1998, Louisiana Tech University has promoted electronic learning by deploying compressed video equipment in more than eighteen public schools throughout rural northern Louisiana. The multi-mode delivery systems, funded by a state grant and the University, were provided at no charge to the school systems. Costs for T-1 line charges were the responsibility of the public schools and frequently qualified for a reduced or e-rate.

Course offerings have ranged from college preparatory, e.g., English and Mathematics, to undergraduate and graduate. Typical courses from the College of Education have concentrated in principalship, school law, classroom management, secondary curriculum and courses relevant to teacher certification. Courses at the doctoral or EdD level have also been offered. A key factor in the deployment of compressed video delivery systems and the offering of courses was the ability to develop a relationship built on trust between Louisiana Tech University and rural school districts. A relationship that addresses administrative, organizational and funding challenges, as well geographical and technical obstacles in order to successfully deliver courses from the University. Before courses sought by school students and teachers could be offered by TECH, several issues in the overall process had to be addressed, including: funding, equipment, telecommunication services, facilities, manpower and training.

Funding the cost of compressed video equipment, line charges and instructional support were critical. A combination of grant monies, with "buy-in" from the public school districts and Louisiana Tech University, made electronic delivery of courses possible.

Equipment costs were provided primarily by a Louisiana Department of Education (DOE) grant program entitled LA. LEARN and Louisiana Tech University. Compressed video line charges through BellSouth were covered initially by LA. LEARN/DOE, but after the grant expired, reverted to school districts. TECH helped one district with line charges for the first year, until they qualified for the E-Rate. Instruction and related support costs were viewed as the "cost of doing business" and borne by the individual entities. However, in some cases the University has paid districts for use of school facilities and for providing onsite class proctors.

After responsibilities are identified and roles begin to be coordinated, the "buy-in" by the University and public schools becomes a "win/win" situation. Each contributes resources and each benefits, as is the case of providing manpower for instructional support. For example, each school district designates a Telecommunication Coordinator (TC) and a Site Coordinator (SC). The TC serves as liaison with TECH for arranging with BellSouth to provide telecommunication services to the various public schools. The school system also identifies a SC at each school as liaison with the University for facilities and support at the individual school. With the designation of liaisons, an essential line of communication and organization is established and deployment of equipment at school sites can begin.

Selection of equipment is based primarily on competitive costs and features. Most of the compressed video equipment being manufactured today is standards-based and able to interact, regardless of brand. The best-known manufacturers are Intel, Picture Tel, PolyCom,VizCam and V-Tel. With the advent of electronic learning, the number of re-sellers and vendors has increased. As with most technology, the cost of compressed video equipment decreases over time, while the variety of features increase. To simplify training and technical support, it is wise to standardize equipment used among school sites. Technical repairs and support is the responsibility of the school system. While compressed video equipment is usually reliable, it is wise to purchase service contracts to expedite repairs, if funds are available. As with any technology, innovations in equipment and telecommunications are introduced each year.

The establishment of telecommunication services is a reasonably simple process. In the parishes of northern Louisiana, rural schools often seek advice from the University, as a liaison with BellSouth and with equipment vendors. T-1 lines are needed at each public school, as several sites are still not connected to Internet. Also, each school site had a different physical plant infrastructure. A billing account was set up for individual public schools with the State Office of Telecommunications (OTM), which negotiates with BellSouth for telecom services. After T-1 connections were completed by BellSouth and compressed video equipment was installed by vendors, tests were conducted between TECH, the public school site and BellSouth. The successful systems test of electronic delivery equipment and telecommunications technology leads to BellSouth and OTM certification for the public school. Delivery of courses can begin. Once the technology infrastructure is certified, administrative roles must be established. For example, Telecommunication Coordinators assume responsibility for maintaining BellSouth services with the State Office of Telecommunications. Site Coordinators become

responsible for managing classroom facilities and proctors, who provide onsite management between the remote classroom and University. As new roles solidify, it is essential that group communication or idea sharing continue and that "thinking beyond the box" is encouraged throughout the process. A number of administrative issues require the attention of the University and public school systems. Site Agreements executed between TECH and public schools were critical to each understanding individual responsibilities for providing facilities, telecommunication services, training, marketing, as well as meeting enrollment expectations in the courses offered by TECH. Course offerings to rural public schools in northern Louisiana began in the Spring 1999 with eleven teacher workshops held at nine sites. Over four-hundred school administrators and teachers participated. Since Fall 1999, approximately 27 courses have been offered by Louisiana Tech to rural public schools in northern Louisiana. Enrollment in the courses has exceeded seven hundred and fifty. The relationship that developed has been a "win/win" situation for TECH and rural public schools. Developing the relationship between Louisiana Tech University and rural public school systems was built on the basic foundation of mutual communication, commitment, trust and the sharing of resources.

All levels of education in Louisiana are undergoing dynamic change, despite limited resources and taxpayer support, plus an increasing demand for accountability and improved performance. As Louisiana places emphasis on teacher certification, teacher preparation and the infusion of technology at all levels of education, the future looks bright. At Louisiana Tech University, future directions for electronic learning programs are expected to include increased college course offerings to public schools, including not only undergraduate, graduate and doctoral courses, but college prep topics. An increase in the number of public school compressed video sites will depend on support among local educators, as demonstrated through course enrollments. Growth in programs and remote school sites will also be affected by maintaining E-Rate discounts for telecommunications, innovations in delivery technology and continued collaboration between participants. As educators, students and politicians realize the long-term economic benefits and cost efficiency of the partnership in electronic learning between higher education institutions and public school systems, as in northern Louisiana, it is hoped that similar collaborations develop. As has been said, "If you think education is expensive, try ignorance".

Electronic Portfolio Design

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Abstract:
This paper presents an approach for designing and developing an electronic based student portfolio management system. As an institution, we have been striving to provide students with a means to demonstrate the competencies they have achieved during their college career. One of the obstacles colleges face in portfolio development is that much of the student's work is in an electronic format. To accommodate this, we have investigated methods of maintaining a college wide database of student portfolios.

Electronic portfolios are becoming increasingly popular with educators and business people as a tool for maintaining and showcasing student's work. Student portfolios demonstrate student's accomplishments and capabilities. Technology allows students to develop electronic portfolios, which conveniently and securely store and document their work.

Electronic portfolios are collections of work, which can be stored digitally on a variety of media. They demonstrate a student's intellectual growth and current capabilities. They offer a much more flexible venue in that they can include data as well as text, audio, video, and graphics.

This paper presents an approach for selecting the media for an electronic based student portfolio management system. Universities strive to provide students with a means to demonstrate the competencies they have achieved during their college career. One of the stumbling blocks associated with maintaining a portfolio in today's educational environment is that much of the student's work is in an electronic format. To accommodate this, we have investigated methods of maintaining a college wide database of student portfolios.

With the goal of maintaining a college wide electronic portfolio database in mind, we established a set of criteria that we felt we had to meet in order to establish an effective and usable student electronic portfolio system.

Our first criteria, of course, was that it had to be technically feasible, both from a cost standpoint and from a student and faculty use standpoint. We addressed the question of the maturity, stability, and reliability of the technology. We were very concerned about ease of use for students, because if it was not easy to use, it would probably not be used. From the faculty's perspective, we recognized that if it were not manageable and relatively easy to use, we would not see strong faculty support for its use.

The options for maintaining electronic portfolios were varied in their feasibility and effectiveness. The investigated options were all technically feasible for this institution and included maintaining the portfolios on: recordable CD media, ZIP disks, floppy diskettes, Internet accessible Web site, and student accessible file server.

Recordable CD Media:

Recordable CD-ROM media and associated recorders and readers are widely available and relatively affordable. To use this approach, the student would "burn" their projects onto the media either with their personal equipment or at the institution's resource center. The storage capacity is high for this type of media.Pros: Recordable CD media provides relatively permanent and fairly durable storage. The media is inexpensive (typically less than a dollar per CD). It is portable and provides a secure and private storage environment.

Cons: Even with the most modern CD recording equipment, the recording process tends to be slow and relatively labor intensive. CD recorders while 'affordable', are still not widely accessible. While the storage capacity is high for this media, over 600 megabytes, it drops dramatically with successive "writes." CDs are easy to lose and may be damaged if not shown a reasonable degree of care. Students are accustomed to music CDs, which continue to function quite well, even if severely abused, thus they tend not to have an appreciation for the care required for a data CD. Successful recording normally requires technical assistance and there is a high learning curve if the CDs are student maintained or high administrative expense if they are institutionally maintained.

Decision: REJECTED primarily because there is an unacceptably high administrative cost and learning curve associated with them.

ZIP Disks:

The ZIP disk is another widely used mature technology with relatively high capacity and excellent reliability. The media tends to be more expensive than recordable CD-ROM media: approximately $10 versus $1 for the CD-ROM. The storage capacity is approximately 100 megabytes or 250 megabytes and is not subject to degradation with reuse. Ease of use is one the ZIP disk's strong points. A student would use it as if it were a floppy diskette, reading and writing to the disk like any other drive in the

computer.Pros: Moderately priced and very reliable. ZIP disks have a medium to large storage capacity that does not degrade with reuse. There is virtually no learning curve associated with the use of the disks; if the student knows how to use the computer they know how to use the ZIP disk. They are portable and widely available. Like the CD-ROM, they afford the user high security and privacy.

Cons: ZIP disks are easy to lose if not maintained by the institution. Their portability and desirability make them much more likely to get lost, or go astray.

Decision: REJECTED primarily because of the unacceptably high risk of loss.

Floppy Diskettes:
Floppy diskettes are certainly the most mature storage available with personal computers and the storage media students are most familiar with. They are widely considered to be one of the least reliable components of the computer system. Like the ZIP disk there is virtually no learning curve associated with them.

Pros: Floppy diskettes are inexpensive at about a dollar each. They are widely accepted storage media with practically no learning curve associated with them and they are extremely portable.

Cons: While they are inexpensive, on a unit storage per dollar basis, they actually are one of the most expensive storage mediums available at over $5 a megabyte. They are low capacity, unreliable and easily damaged, and easy to lose if not maintained by the institution

Decision: REJECTED because of high cost, insufficient capacity and excessive failure rate and loss.

Internet Accessible Web Site:
The concept of a widely accessible Web site storage location is inherently very attractive. Being able to access your materials from any location is convenient and increases the likelihood that students would take advantage of the storage facility. Security issues abound, however, and making a site secure and private can be costly in software and administration expense.

Pros: Web sites are widely accessible and the user interface is easy to use. Basic sites tend to be relatively inexpensive to house. Like all hard drive storage, costs are low.

Cons: Web site security tends to be very weak without high cost software and administration. They are weak in the area of student confidentiality and there is a high potential for intellectual property violations. Off site access can be slow and all access can be slow during prime usage times.

Decision: REJECTED because of excessive security risk, intellectual property concerns, and high setup and administrative costs associated with a secure system.

Student Accessible File Server:
In networked environments, the concept of using "shared" drives is well established and with most network operating systems, controlling access is relatively straightforward. There is a modest learning curve associated with this approach, but network file handling tends to be something that students tend to teach one another. Media costs have fallen dramatically and are now on the order of pennies per megabyte.Pros: High security; can easily be password protected and setting the drive up as "write once" protects files from accidental overwrites. The drives are easily backed up and normally very experienced and qualified people are involved in this process. The drives tend to be easy to use (simple file copy). They provide a single storage point, which is easy to manage and faculty can easily find and review materials. Security is good, but not great because of the number of people involved.Cons: This type of storage is accessible only on campus because of security concerns about outside access to the campus network. Faculty assistance is required to change or delete items because students have "write once" file permissions. Subject to "file size" abuse; there are no controls on how much material a student may put on the shared drive and they are notoriously weak in policing themselves to eliminate unnecessary and outdated materials.

Decision: ACCEPTED because it is easy to use, relatively secure, easy to backup for redundancy purposes, little chance of file loss, low administrative overhead cost, and relatively low program cost.

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Revisiting the Impact of Technology on Teaching and Learning at Middle Tennessee State University:
A Comparative Case Study

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Introduction

Middle Tennessee State University (MTSU) in Murfreesboro, Tennessee, is an emerging major institution of higher education in the state, region, and nation serving a diverse population of full- and part-time, traditional and non-traditional students. The University has experienced a steady student population growth and provides a positive educational experience in a supportive campus environment. In the 2000-2001 academic year, 19,121 students are enrolled in six undergraduate colleges and thirty-five graduate studies areas. MTSU's administration maintains an unwavering commitment to promoting instructional technology as a crucial part of the higher education equation for their faculty and students.

How do the faculty and students of MTSU feel about the effectiveness of instructional technology on their campus? The Office of Information Technology (OIT) embarked on a survey of MTSU faculty in the spring 1998, and of students in spring 1999, to assess the impact of technology on teaching and learning. However, because of on-going innovations and wider availability of new technology, a strong possibility existed that the findings of these surveys had become outdated in two short years. A new set of data was needed to determine the impact of these changes; therefore, in fall 2000 and spring 2001, follow-up surveys targeted the same populations.

At the time of the initial studies, great strides had been made in the area of instructional technology (IT) at MTSU. Microcomputers had been provided for every full-time faculty member, a new academic building equipped with technology-based classrooms had opened in 1997, faculty had been enjoying a comprehensive level of instructional technology support featuring access to technology that includes a campus-wide network, technology-based classrooms, computer labs, and two multimedia development centers. Additionally, faculty were offered training in the use of hardware and software, consultation with instructional technology staff, release time to develop technology-based instructional materials, and recognition of their instructional technology achievements. In

addition to continuing and expanding support in all these areas in the two years between the two sets of surveys, OIT has also increased its support staff, the conductivity of its Internet network, and the number of technology-based classrooms. The University also purchased a site license for Blackboard's web course creation and management software, CourseInfo, which has resulted in a significant increase in the number of web-assisted and web-based courses. Currently, over four hundred and ninety-five courses are being offered using CourseInfo.

The purpose of this paper is to offer a description of the questionnaires, an overview of the two initial surveys, the details about the follow-up studies, and a comparison of the two sets of results for each of the two populations. As was the case with their predecessors, the results have provided valuable information that will help determine measures for improving educational technology resources and services for MTSU faculty and students.

The Questionnaires

Rather than compare the effectiveness of instructional technology to traditional teaching, comprised of many dynamic, immeasurable, and complex components, the authors of the initial studies measured IT's impact on the depth and breadth of content covered, student performance, and good teaching practices widely acknowledged as catalysts for improved learning. The good teaching practices used in the surveys were adapted from the "seven principles of good practice in undergraduate education." (Chickering & Gamson, 1987) The practices include student interaction with instructor, student collaboration, student participation and feedback and high expectation of student performance.

The ten to fifteen minute questionnaires consisted of four parts focusing on each population's general perceptions and opinions about instructional technology, the frequency of use, projected use, and demographics. While faculty at large were polled, only undergraduate students taking courses in technology-based classrooms whose faculty agreed to participate in the study received the questionnaire. After having each questionnaire sample tested by a group of faculty and students, the surveys were determined to be reliable. Faculty surveys were mailed out, and student surveys were distributed through the participating faculty. The anonymity of both populations was closely guarded. The response to the initial studies reflected 35% of the faculty and 8% of all undergraduate students. The response to the follow-up studies included 23% of the faculty and 8% of all undergraduate students.

The Initial Studies

Results of the initial faculty survey showed that the overwhelming majority of MTSU faculty believes that IT is essential and is being widely used across campus with different technologies accommodating different teaching practices. Five major findings emerged which were used to help MTSU faculty and administrators better understand the state of IT on the campus and identify the resources that are needed to ensure its future:

1. Faculty believe that IT is essential
2. Faculty have a variety of needs relating to IT
3. IT is being widely used across the campus
4. Different IT accommodate different teaching practices
5. Faculty IT use will continue to increase

The results of the initial student survey yielded similar findings:

1. The use of IT positively affects student learning
2. The use of IT increases student interest and satisfaction
3. The role of faculty and their ability to use IT are major factors
4. Certain IT techniques better facilitate certain learning activities
5. IT is an integral part of today's learning environment

The results of the initial studies concur with one another. Faculty demonstrate their acceptance and adoption of IT as a "good teaching" practice, while students agree that it significantly enhances their learning; however, the study data revealed that from the faculty perspective, lack of time and resources limits the development and implementation of technology in instruction.

The Follow-up Studies

The follow-up studies were based on the same principles as their original counterparts and aimed at the same goals. Even the same method of administering the questionnaires to the faculty and students was used. The format of the questionnaires was kept the same; however, some questions were modified and a couple added to reflect the increased growth of web-based learning opportunities.

The results of the follow-up faculty survey echo the major findings of its predecessor, with faculty reporting that IT is essential. Additionally, faculty continue to feel 1) that their office equipment is adequate, 2) that technology-based classrooms are important, and 3) that web-based training enhances student learning. However, faculty report a need for 1) more time to develop and adapt course materials for the use of IT, 2) a more positive effect on tenure and promotion as a result of integrating IT, and 3) more training. Faculty are ready and eager to meet the demand in the use of IT; as they become more aware of the potential, they desire more training. While only twenty-nine percent feel competent in using web-authoring tools, an impressive thirty-seven percent indicate having the skills and knowledge to use course-management products such as CourseInfo.

It is also encouraging that there continues to be no significant difference in the responses among faculty ranks, among tenure/non-tenure faculty, nor among their years in education or years at MTSU. Interestingly, the percentage of faculty responding from the different colleges does show a healthy increase among Liberal Arts faculty, from eighteen percent in the initial survey to twenty-six percent in the follow-up. This increase could be indicative of the influx of IT into this area where it had been lacking before. However, in spite of the change in percent of faculty responding, there are also no

significant differences in faculty perceptions among colleges, a clear indicator of the type of prevalent and readily available training and assistance already being provided on our campus.

In the area of different IT accommodating different teaching practices, the same high rate of correlation between survey results exists. Eighty-seven percent of the respondents in the initial survey perceive positive effects of the use of electronic communication. In the follow-up survey, more specific types of communication were indicated, and while, email received a higher percentage, ninety-eight percent, discussion boards and virtual chats show they are still in the development stages, thirty-five and twenty-eight percent, respectively. The increase in these areas leads to a decline in the use of other audio-visual equipment, from eighty-one to seventy-five percent. Faculty continue to underestimate the positive effect of technology on student performance; in each area of IT application covered in the initial and follow-up questionnaires, performance exceeded expectation; however, they express concerns that the technology needs to be thought of as a tool and that it is the effective use of that tool which makes the difference in its impact on learning. As one faculty put it, "By itself, it is neither important or unimportant; how it is used is what makes any technology workable and effective." The results of these positive views affect faculty projections on the future use of IT.

The data from both surveys reveal not only that the use of IT will continue to grow among MTSU faculty, but that the level of sophistication in the applications will also. Twenty-five percent of the respondents indicated that they would use the web as the primary source for course delivery in the future.

The results of the follow-up student survey continue to show a high degree of positive student attitude in the areas of IT's effect on student learning, interest, and satisfaction, and they now perceive IT as an expected part of today's learning environment. Ninety-five percent of responding students continue to agree that "the use of technology in the classroom can enhance student learning." Results also show a ten to sixteen percent increase in the number of students reporting competency in basic computer applications, electronic communication, and use of web-based materials. However, the ability of faculty to use technology as an effective teaching tool remains an issue for some students. They express concerns about faculty who lack the proper skills to use or who misuse the technology.

Encouragingly, a statistical comparison on Part I of the survey, on the availability of IT at MTSU, shows a significant change in a positive direction, indicating that students are aware of the more widespread availability of technology. In contrast, Part II shows no significant statistical change, continuing to reflect positive student perception of faculty IT use and its effect on student learning. Part III, on projected use of IT, shows significant statistical movement in the negative direction, suggesting that because IT is more commonplace, students are more likely to make decisions about courses based on variables other than technology applications.

Conclusion

The results of new studies and their comparison to their predecessors have yielded some interesting and encouraging results. Just as with the initial surveys, there is a highly positive trend in the responses and the perception of the value of IT. This indicates the University continues to make progress in disseminating information, training, and supporting faculty in the use of IT, but more importantly, it indicates that the interest in and readiness for implementing IT continues to grow unabatedly. On the other hand, some student comments point out weaknesses in the pedagogical application of IT, expressing concerns over faculty competence with and, in some cases, the wise use of IT. This information will help OIT to redirect the focus of its faculty training from technical competency to effective technology integration. Complete results from the initial and follow-up studies (questionnaires and reports) are available at http://www.mtsu.edu/~itsurvey .

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Computer Animations as a Tool for Teaching the Evolution of Musical Form

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Abstract

Macromedia's Flash software allows for the production of intriguing animations that illustrate concepts in music such as the evolution of forms, the transcription of early notation, and the technical analysis of individual works. These subjects are often forbidding for undergraduates but the animations present them in a more lively and engaging context. This is particularly true when the students are a part of the design and creation process.

Introduction

In the summer of 2000, I was awarded a Summer Technology Fellowship by the Associated Colleges of the South to create a series of animations to facilitate the teaching of music in the Middle Ages. This period of music history is difficult for music history students at first because they are dealing with unfamiliar tonal systems, notation, and liturgy. Gregorian chant which is so central to the history of western music is only vaguely understood even by members of the class from strong liturgical backgrounds. As a result, all of the details of how western music grew from the seeds of chant can become a somewhat confusing.

Animations provide a way to clarify the basic important ideas that came out of this period. Using a two minute animation to demonstrate the changing function of chant over a five hundred year period may seem like too much of a simplification. However, the animation can build the framework on which to add all the other contributing facts. The techniques used for the medieval animations were later used in student projects from all eras of music history.

Flash is ideally suited for creating teaching tools to be used over the Web. It allows for animations to import graphics and sounds and at the same time keep the file size manageable. The program can save the animation and place it in an HTML document in one stroke. The animations can also be saved as standalone documents and stored on a CD-ROM. This session will demonstrate some of the products created in the Rhodes music department and give a brief demonstration of exactly how this is done.

Victimae paschali laudes: How Sequences Work

An entirely different meaning for the word "sequence" than we usually think of in music is a sequence which is an accretion to the liturgy. It began with the addition of florid passages to the last syllable of the word "Alleluia." These passages became so lengthy that eventually text was added to help the singers remember the pitches of the new notes. This text was oven arranged in an ABBCCDD. . .X configuration. Hundreds of sequences appeared during the Middle Ages, only to be pared down to four after the reforms of the

Council of Trent in 1545-63. Victimae paschali laudes is one of the remaining sequences. Because of its ongoing appearance is an assortment of guises throughout the history of music, it is a good one to use to illustrate the idea of sequence to students.

The animation is built around an imported .aiff file. The program allows this file to be converted into a streaming version than can be linked to exactly the desired spot in the graphic animation. Successive screens show the score of the melody. The bottom of the page contains a graphic outline of the form with each set of verses being assigned a different color. The notes in the score correspond to the appropriate place in the graphic outline. Controller buttons allow the animation to begin, to pause, and to rewind. As the melody unfolds a box appears over the outline graphic at the appropriate place.

The URL for the animation is:
http://gray.music.rhodes.edu/musichtmls/flash/Victimae.html

The Guidonian Hand: Teaching Sightreading in the 11th Century
This animation brings to life an icon of early music, the Guidonian Hand. Guido d'Arezzo (c. 990-1050) was a monk who developed the set of syllables, ut, re, mi, fa, sol, la to help students memorize the patterns of whole steps and half steps in the G, C, and F hexachords. The syllables came from the first syllable in each phrase of the hymn Ut queant laxis. The pitches for each of the beginning syllables go up stepwise in whole steps except for the half step (mi-fa) between the third and fourth notes.

The Guidonian Hand associated each pitch with a joint in the hand. The hexachords overlapped so that some joints served as pivot points between two different hexachords. The hand took into account the B natural in the G hexachord and the B flat in the F hexachord. The drawing of the hand itself did not appear in treatises until the late 13th century.
Here, I have taken the drawing and used animation to show exactly how the hexachords overlap and to show how each joint of the fingers represent different pitches in different hexachords. A recording of chant is imported into the file and animated arrows follow the path that the choir director would have used as he employed this technique to remind singers of the notes in a melody.

The URL is: http://gray.music.rhodes.edu/musichtmls/flash/guido.html

The Medieval Church Modes
Gregorian chants is based around eight church modes, four authentics and their corresponding plagals. This system is somewhat more complex than the kind of major/minor scale system known to most undergraduates. In this animation the student is able to click on a mode name, hear it played and see its final and tenor indicated in red and green. It also allows the student to easily see the relationship between the paired authentic and plagal set.

The URL is: http://gray.music.rhodes.edu/musichtmls/flash/modes.html

The Use of Finals and Tenors in Church Modes
In the Middle Ages liturgical chants were written around eight church modes, rather than in the major/minor system most church music is written in today. These modes contain dominating pitches that roughly correspond to tonics and dominants in our tonal system. In this animation a piece of chant in Mixolydian mode is played and the final and tenor are indicated by red and green notes. This lets the students see how the melody goes from a starting place (red) to a secondary emphasis (green) and back again. It also helps the student understand how to read Gregorian notation.

The URL is http://gray.music.rhodes.edu/musichtmls/flash/Communion.html

Secular Song in the 14th Century
In the 14th century composers used arrangements of texts and music known as the formes fixes. These include the ballade, the virelai, and the rondeau. Usually their forms is indicated by a set of A's and B's, some capitalized and some not to indicate when words and music are both repeated or when the music is the same but the worlds are different in the various lines. These animations add a level of color and shape to help the student remember the forms. The URLs are:

Ballade: http://gray.music.rhodes.edu/musichtmls/flash/ballade.html

Virelai: http://gray.music.rhodes.edu/musichtmls/flash/virelai.html

Rondeau: http://gray.music.rhodes.edu/musichtmls/flash/rondeau.html

Evolution of Chant from the 9th to the 14th Century
Plainchant was central to the music of the Christian church for over a thousand years. This animation illustrates how it began as an unadorned, monophonic line that by the 9th century was doubled at the fifth, fourth and octave. By the 12th century, a new melismatic melody line appeared above the chant, forcing the individual pitches of the original chant increasingly apart. By the 13th century, two or more lines of music and sacred Latin texts were added above the chant and it became increasingly difficult for the chant melody to maintain its identity. Later, secular French texts were written above the chant melody line and it became the supporting bass line, its original meaning and function having radically changed. This can be seen as a reflection of the declining power of the church and the rise of the secular states during the same period of time. The animation uses some whimsical representations of the sacred and the secular to drive home the point.

Conclusion
I have used these animations in both beginning and advanced music history classes. Students find them to be engaging and appear to remember the concepts more firmly because of the animated graphic presentation. Students can be involved in creating concepts for new animations to illustrate other points. The process of conceiving and designing such an animation is yet another way to assure that students have internalized new ideas.

Web-Enhanced Teaching: Advantages of Integrating Technology into the Large Lecture Course

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Abstract
Web-Enhanced courses are effective in transforming the large lecture course to a small-scale course. The purpose of this presentation is to identify the advantages to both faculty and students in web-enhanced course environments.

The benefits to faculty and students revolve around access and flexibility. In addition, students are better prepared to enroll in future web-based courses and faculty may use it as a stepping stone to eventually offer a web-based course.

Proceeding
Web-Enhanced courses are effective in transforming the large lecture course to a small-scale course. The purpose of this presentation was to identify the advantages to both faculty and students in web-enhanced course environments. Advantages to both faculty and student include access and flexibility. Students may access online course notes if absent which is valuable to both faculty and students. It also allows for flexibility for students who work or have a rigorous course schedule. An additional outcome of this type of environment is a student-centered learning approach.

Providing students with study guides, course notes, FAQ's, and resources relevant to the course enables the active learner. This allows the faculty member to keep current with their course curriculum. The flexibility with the online information is that it can be easily updated. Currency in information is not only important for the student but for the faculty member.

Involving a quiz component, that may be graded or not graded, saves the faculty member time of grading and allows the student to take the test at his or her own convenience. An ungraded quiz can be used to help students learn material at their own pace and serve as a knowledge assessment tool.

Adding a discussion board to a face-to-face classroom extends the classroom community into an electronic community. The discussion boards may be found through a course management tool, such as Blackboard or WebCT, or as a shareware/freeware from independent programmers. An example of an independent program would be First Class as this tool is predominantly used for conversation and writing collaboration. Another

tool used to incorporate a classroom community would be a class list serve. The advantages of asynchronous communication tools are the availability for the student to share ideas, discuss problems, and provide solutions among each other. Students learning from students is a pedagogically sought after approach to building a knowledge base.

With the use of active learning, students cannot respond passively and are more willing to discuss the subject matter in more detail anytime and anywhere than in a face-to-face environment. This pedagogical method supports competent critical thinking skills along with the writing in the curriculum. The faculty is able to monitor and guide independent learning and discussions, again anytime and anywhere, into learning experiences for the entire class. Students feel a part of a learning community and the faculty member has an idea of the learning growth in the students. The faculty also is able to incorporate real-world situations and allow communication with experts, including world-renowned guest lecturers.

Proper evaluation and monitoring the discussion area is critical. The course objectives and requirements for discussions must be very detailed and well planned. The discussion requirement may be substantial portion of the final grade. Students are required to post validated or supported discussions each week. Students are also required to reply, which may be a challenge or an agreement, to their classmates with the same level of validation and support for their statement. This ensures that the students are accessing and evaluating research that is relevant to the topic area for that weekly module.

The opportunities of discussion boards are endless. Integrating a face-to-face and an online class allows for good discussion and team project development. Previous experience is that the face-to-face students are impressed with the reality of pulling together group projects without meeting other students face-to-face. It has been noted that discussions are at a higher level of learning online as opposed to 20-30% of the students interacting within a traditional classroom. An intriguing activity is to allow students to self select their groups. Personal sketch or bio area supports the self-selection activity. It has been found that group projects do not suffer creativity when integrating online and face-to-face classrooms. In an online environment, students keep other students on task with group projects. Faculties have complete access to student discussion and are able to monitor student involvement and interaction. This allows the professor to ensure that all students equally participate in the group project.

While the majority of the students may be computer literate, there is an intrinsic need for knowing how to apply the technology. Utilizing web-enhanced courses in the undergraduate level will prepare students in the future if they opt to enroll in a web-based course. In addition to the benefits to the students, the experiences gained with web-enhanced teaching would serve as a stepping stone for faculties that want to eventually offer a web-based course. Students, in turn, would benefit by having the online concept introduced gradually and perhaps increase their confidence in enrolling in an online course.

Promoting Transfer of Mathematics Skills Through the Use of a Computer-Based Instructional Simulation Game and Advisement.

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Abstract

This study looked at the effect of contextual advisement and competition on transfer of mathematics skills in a computer-based instructional simulation game and simulation in which game participants helped their "aunt and uncle" fix up a house. Competition referred to whether or not the participant was playing against a computer character, and context of advisement referred to whether the participant had access to a reference book and video clips, or just the reference book. The video consisted of advice on how to solve the problem and was delivered by the "aunt and uncle." One hundred and twenty-three seventh- and eighth-grade students were randomly assigned to one of five conditions formed by crossing the two independent variables and adding a control group. Results indicated that non-competitive conditions may be best for transfer learning and that high-contextual advisement (video) may promote transfer.

Purpose

The primary purpose of this study was to determine if a computer-based instructional mathematics simulation game or simulation (delineated by the presence or absence of competitive elements) could promote transfer by including built-in advisement and by situating the transfer opportunities and advisement in a meaningful, authentic context.

Transfer

Despite the importance of transfer of learning in education, learners in general do not transfer learning (Asch, 1969, Gick & Holyoak 1980; Perfetto, Bransford, and Franks, 1983; Reed, Ernst, & Banerji, 1974; Simon & Hayes, 1976; Thurman, 1993; Weisberg, DiCamillo, & Phillips, 1978) including, according to the Cognition and Technology Group at Vanderbilt (CTGV) mathematics (CTGV, 1992a, 1992b; Van Haneghan, 1990).

Royer (1979) defines transfer in general as "the extent to which the learning of an instructional event contributes to or detracts from subsequent problem solving or the learning of subsequent instructional events" and says that "transfer of learning is evidenced by the ability to apply a particular skill, or bit of knowledge, to situations differing from those encountered during original learning" (p. 53).

Evidence suggests that problem solving and transfer are largely domain specific, so transfer is not likely to occur as the result of general problem-solving instruction (Larkin, 1989), but instead requires multiple practice opportunities in a variety of contexts (Gagné, Briggs, & Wager, 1992).

Formal learning frequently assumes that abstract principles and skills are applicable across multiple domains and that transfer will emerge automatically from the acquisition of these general skills. Although some cognitive psychologists disagree that knowledge is wholly tied to the context in which it is learned (e.g., Anderson et al., 1996), many researchers have found that knowledge and transfer are strongly tied to context and domain (e.g., Bransford, Franks, Vye, & Sherwood, 1989; Bransford, Sherwood, Vye, & Rieser, 1986; Brown, Collins, & Duguid, 1989; Perkins & Salomon, 1989).

In contrast, lateral or, as Gagné (1965) refers to it, horizontal transfer, refers to "the sort of transfer that occurs when a child recognizes that the fractions he is learning about in school are relevant to the problem of deciding how to divide up a prized, but jointly owned, marble collection" (Royer, 1979, p. 54).

Transfer in this study is categorized as positive, horizontal transfer. Horizontal transfer (Gagné, 1965) refers to "the sort of transfer that occurs when a child recognizes that the fractions he is learning about in school are relevant to the problem of deciding how to divide up a prized, but jointly owned, marble collection" (Royer, 1979, p. 54).

In this study, the participants applied previously learned mathematics skills in a new context beyond what may be found in most traditional mathematics instruction. Students who had studied area, volume, perimeter, addition, subtraction, multiplication, division, and calculation of equivalent measurements were required to apply this prior learning to determine the amount of paint and wallpaper border needed to remodel a room in a house.

Operational Definition: Transfer of Mathematics Skills

The activation, retrieval, and application of previously acquired mathematics skills to the successful solution of a problem set in a novel context. Novel refers to a performance context in which the stimulus elements differ from those in the original learning context. In this study, transfer as defined above was measured by transfer scores, which were measured by the ability to select and apply relevant formulas to two problems in a simulation or simulation game.

Anchored Instruction

One way to address failure to transfer is through the use of authentic learning paradigms such as anchored instruction, which is related to situated cognition, a theory proposed by Lave and Wenger (1991). In this theory, "knowing" and "doing" are not separate concepts, as is often assumed in formal instruction. The emphasis in anchored instruction is to design learning and teaching activities around an authentic situation. The learning events, or "anchors," are embedded in problem-solving environments that the learner is free to explore.

Anchored instruction has been experimentally shown to promote performance and transfer (Sherwood & the Cognition and Technology Group at Vanderbilt [CTGV], 1991; CTGV, 1993; Van Haneghan et al., 1992) and to be more effective in teaching mathematical problem-solving skills than traditional instruction.

Instructional simulations and games present an excellent means for promoting problem-solving skills and transfer of prior learning by accommodating anchored instruction principles. Anchored instruction requires that the learning take place in a realistic problem-solving situation and that the learner be able to explore the environment. Computer-based games allow for the former through the use of graphics, sound, text, and video, and for the latter through navigational options (e.g., clicking on different parts of the screen to navigate to different places in the environment). While, in theory, well-designed games should function similarly to anchored instruction, no research that had examined this could be found.

Advisement

One problem with using computer-based instruction, however, is that the learner must function more autonomously since, in many cases, access to an instructor is limited. While programs can be written to provide adaptive kinds of intervention (i.e., to provide remediation and/or challenge based on student performance in the instruction to that point), such programs are complex to program and can be prohibitively costly (e.g., Fingar, 1999; Tennyson, 1984) and, as Tennyson (1981) points out, ignore "the important educational goal of student responsibility in learning" (p. 426).

The problem with learner control is that research has shown that novice learners are ill-equipped to manage their own instruction, at least without feedback (Carrier, 1984; Fisher et al., 1975; Park & Tennyson, 1980; Reinking, 1983; Tennyson, 1980a, 1980b; Tennyson and Buttrey, 1980). According to Peters (1988), the problem with learner control may lie in the "learners' failure to make effective use of the control given them" (p. 3). Researchers have looked to advisement, or "coaching," to provide enough information to learners for them to effectively manage their own learning in computer-based instruction. Advisement can help learners process content or clear up misconceptions-roles usually addressed by a teacher in traditional instruction.

There is some support for integrating video advisors of this nature into computer-based training (CBT). A model for human-computer interaction proposed by Streitz (1988) posits that interaction problems require the learner to build a representation of the tutoring system. In addition to the "learner" and the "system," the model proposes a human tutor who functions as a problem mediator, making suggestions or asking questions about specific content domains. It is this type of advisement that this study and others explore (Bennett, 1992; Boulet, 1993, 1994; Clariana, 1989; Fingar, 1999).

Such forms of advisement may have special relevance for promoting transfer. One means of promoting transfer of learning involves making the connection between the learning context and performance context explicit (Adams et al., 1988; Brown, 1989; Gick & Holyoak, 1980; Hayes & Simon, 1977; Lockhart et al., 1987; Perfetto et al., 1983; Reed et al., 1974; Simon & Hayes, 1976; Weisberg et al., 1978). Likewise, for insight problems (those that require reconceptualizing the problem), helping learners to think about the problem in a new way has been shown to increase transfer of learning (Lockhart et al.).

If, as some researchers suggest (e.g., Black & Schell, 1995; Perkins & Salomon 1989), transfer is highly context dependent and specific, and requires guidance and cueing, then it seems reasonable to assume that a computer-based simulation game with some kind of simulated teacher, or advisor could promote transfer. No research has examined this to date, however. But while research would seem to suggest that the learning and performance contexts should remain as functionally identical as is feasible to promote transfer, it is unclear whether this should be extended to the context of the advisement itself. For instance, advisement could have little to do with the context of the game (e.g., be delivered in the form of text-based prompts and resources) or be intrinsically embedded in the game (e.g., be delivered by a character who is part of the game context). This study examined both forms of advisement.

Operational Definition: Advisement

Advisement is solicited help provided to the learner regarding how to go about solving a problem. As such, it may consist of prompts or cues to reformulate the problem, modeling of problem-solving behavior, and identification of tools and knowledge needed to solve the problem.

Operational Definition: Context of Advisement

Context of advisement refers to the internal and external events associated with the delivery of solicited advice. In this research, advisement has either a high or low level of congruency between the learning context (a game that relies on a storyline about painting and redecorating a room in a house) and the type of advisement (either low: text-based listing of relevant and irrelevant formulas, or high: text-based listing of relevant and irrelevant formulas plus a video of two carpenter/decorators discussing the process).

Competition & Games

What role does competition play in all this? A great deal of research supports the positive effects of individual competition on performance (e.g., Fisher, 1976; Hurlock, 1927; Julian & Perry, 1967; Kraft Miller 1981; Spalt, 1987/1988; Wilkes, 1965), while others show no difference (Craig, 1967) or even negative effects (e.g., Cartmill, 1994; Keefer & Karabenick, 1998; Thompson, 1972).

For competition to promote motivation, performance, and learning, students must perform at less than their maximum level of performance in noncompetitive conditions, which may not always be the case. Competition alone cannot make learners function beyond their maximum ability unless they have help, such as a coach, mentor, or advisor. It may be that competition can improve performance, but that the means and extent to which it does so are at least partially determined by the content, the complexity of the learning, familiarity with the content, the nature of who is competing against whom, and other situational characteristics. Likewise, it seems logical to conclude that there may be some conditions (e.g., learner characteristics, domain) under which competition can be detrimental.

The research studies that show benefits of competition appear to focus on knowledge measures and content in non-problem solving contexts (i.e., at the rule and verbal

information levels) and in nonauthentic contexts (i.e., school-based contexts rather than "real world" contexts). It might be argued that such learning requires less cognitive processing than higher-order learning such as problem solving (the most common venue for transfer learning studies).

Operational Definition: Competition
Any condition in which learners are able to compare their performance to some internal or external standard, or to others in their social environment, in such a way that they can tell if they are below, at, or above a reference performance mark.

Operational Definition: Simulation
An interactive experience that contains some representation of a world, real or imagined, that behaves according to a coherent (although not necessarily realistic) set of rules, in which the participant(s) have a clear goal, the pursuit and attainment of which results in an entertaining, rewarding experience.

Operational Definition: Simulation Game
An interactive experience that contains some representation of a world, real or imagined, that behaves according to a coherent (although not necessarily realistic) set of rules, in which the participant(s) have a clear goal, the pursuit and attainment of which results in an entertaining, rewarding experience, and that includes some form of competition.

Alternate Hypotheses

1. Participants who use advisement more often than others will have higher transfer of mathematics scores.
2. Participants in the high-contextual advisement conditions will have higher transfer of mathematics scores than those in the low-contextual advisement conditions.
3. Participants in the non-competitive simulation game conditions will have higher transfer of mathematics scores than participants in the competitive simulation game conditions.
4. Participants in the competitive and non-competitive simulation game conditions will have higher transfer of mathematics scores than participants in the control conditions.

Method

Population
The target population for this study is middle-school-aged children in grades 7 through 8, with a range in age from 11 years to 14 years old. This population was available at several middle schools in a Gulf Coast city, of which four were selected: School A (n = 50), School B (n = 75), School C (n = 123), and School D (n = 80). Schools A and B were used for pilot testing and field trials (respectively) of the game, and School D was unable to participate. Accordingly, the sample for this study included students at School C only. Participants had regular access to the computer lab and access to an edutainment

game on math as well as other knowledge and entertainment games during free lab time as part of their normal studies. Demographic data were collected via self-reported instruments developed for this study.

Lesson Content

The content of the lesson was delivered via a computer-based instructional simulation and simulation game and was developed using the National Council of Teachers of Mathematics (NCTM) 2000 mathematics curriculum standards. In particular, the content covered portions of NCTM 2000 content strands 1, 2, and 3.

Problems based on these goals and standards were developed and integrated into an instructional simulation game in which participants played a peer-aged character working for their aunt and uncle's home remodeling business. Participants were given a room in a house for which they must calculate how much paint was needed to paint the room and how much wallpaper border was needed to put a border around the room at ceiling height.

A computer-based instructional simulation game was developed using Macromedia Authorware 5.1 for Windows 95/98. This simulation game made extensive use of graphics, sound, video, and interactivity. Participants entered a computer-generated room in a "house" and navigated around in it by clicking in the direction they wanted to go. They were able to use a variety of "tools" in the simulation game, including a tape measure to measure walls, doors, and windows, a workbook in which to record information used to solve the problem, a reference book to look up facts and formulas, a calculator, and, in some conditions, a walkie-talkie to call the video advisors for advice. Participants used these tools to learn about the environment (how long/high a wall is, for instance) and they recorded their observations in the workbook built into the simulation game. Participants in the control group were given word problems identical to those in the computer simulation game in the form of a computer tutorial to minimize any differences or resentment due to medium.

Context of Advisement

Advisement was available to all participants in the simulation game. A reference book containing a variety of facts and formulas was provided to all participants. The goal was to measure the ability to apply prior knowledge, not to see if participants had memorized the relevant formulae. Such support devices are common in many computer games. Half the participants were limited to this form of advisement. The rest of the participants received video-based advisement in which their Aunt Ann and Uncle Bob appear to walk into the room and discuss the problem and the solution process. This type of advisement has a high contextual relevance to the storyline of the game itself. These two conditions of advisement are referred to in this study as high- and low-contextual advisement (HCA and LCA, respectively).

Competition

Competition was determined by the presence or absence of a computer-generated competitor. In the competitive environment, participants were told to work quickly

because they were competing against a computer character (whose ability level they chose). They were asked to indicate the level of competitor they wanted: below average, average, or above average. In the noncompetitive environment, participants had no opponent to compete against for time or accuracy, but they were encouraged to work quickly and accurately. The two competition conditions are referred to as with competition (WC) and no competition (NC). The four cells formed by crossing the two advisement conditions and two competition conditions are referred to as high-contextual advisement with competition (HCAWC), high-contextual advisement with no competition (HCANC), low-contextual advisement with competition (LCAWC), and low-contextual advisement with no competition (LCANC).

Controls

The control group was given computer-based word problems that were identical in content to those in the simulation game and simulation. They had no access to advisement, nor was any element of competition involved.

Instruments

In order to collect data for possible use as covariates and for post hoc examinations, a demographic survey was developed to collect data on age, sex, ethnic background, computer experience, mathematics experience, game playing behavior, hours spent on schoolwork and other activities. This scale had a Flesch-Kincaid Grade Level reading score of 3.1.

A pretest was developed to assess incoming mathematics skills and to verify that students were capable performing the mathematical computations required in the simulation game and simulation. This instrument was content validated by the teachers at the participants' schools and by a professor who teaches mathematics instruction to K-12 teachers at a Gulf Coast university. This instrument had a Flesch-Kincaid Grade Level reading score of 5.2.

Students completed the simulation (NC) or simulation game (WC). Transfer of mathematics skills was then assessed via a second computer-based instructional simulation identical in structure and general content but differing in the setting. Whereas the simulation game and simulation context in the intervention consisted of a room in a house, the transfer posttest was assessed by a simulation set in a movie theater, where participants calculated the amount of material to buy to replace the movie curtain and the number of aisle carpet rolls needed to replace the carpet running around the outside of the theater seating area. No advisement was available, nor was there any element of competition present in this simulation.

Transfer was measured both by the ability to select the correct formula and to solve the problem correctly (i.e., either was counted as correct). While transfer might theoretically be measured by the selection of the formula alone, some participants are more sophisticated problem-solvers and may be able to solve the problem intuitively (i.e., without selecting the formula from the reference book). Because no formulas beyond the correct one for a given problem would produce the same answer, and because the

likelihood of guessing the right answer without using the correct formula was small, a correct answer indicated having used the correct formula.

Research Design

The experimental design was a randomized pretest-posttest design with two independent variables and one dependent variable, resulting in a non-crossed 2 X 2 with control group design (see Table 1). Participants were randomly assigned to conditions beforehand, but participated as a class during their normal class time. Independent variables include context of advisement (advisement as either a text-based formula or text-based formula plus video-based discussion of problem, process, and formula) and mode of instruction (with or without competition). The dependent variable was transfer scores.

Table 1

Research Design of Study

Competition				Competition		
Context of Advisement		With Competition (WC)		No Competition (NC)		Control
Low-Contextual Advisement (LCA): (Reference Book Only)		26		24		24
High-Contextual Advisement (HCA): (Reference Book & Video Discussion)		25		24		

The simulation game was piloted on twenty members of the target population and revised accordingly. The simulation game was then formatively evaluated on 10 members of the target population and modified further. The simulation game was then field tested on 75 members of the target population, and minor changes were made based on observations. The simulation game and the simulation were identical except for the presence or absence of a competitor.

Experiment

Participants were selected from seventh- and eighth-grade classes at a Gulf Coast middle school and assigned in a stratified random manner to one of five conditions: low-contextual advisement with competition, low-contextual advisement without competition, high-contextual advisement with competition, high-contextual advisement without competition, or control. After random assignment to conditions, participants were randomly assigned and run as an intact group for the duration of the study.

Pretest

During the first session (day one), participants received orienting instructions explaining

the purpose and process of the study, were given the opportunity to ask questions, and were then given the demographics survey and the pretest, all in computer form.

Simulation/Simulation Game

Participants returned two days later for the second session (day two) and completed a five-minute computer-based simulation game tutorial, which oriented them to the game interface, including all tools within the game and navigation. They were unable to proceed to the simulation or simulation game until they had demonstrated the use of each tool and element of the interface one time. Participants then began playing the simulation (NC) or simulation game (WC) or worked the identical on-line word problems (controls). Data were collected during the game via the computer and stored as text files for later retrieval. A debriefing form was given to the participants to be filled out and returned later. The teachers were instructed not to discuss or teach the content of the game (i.e., area and perimeter) between sessions.

Posttest

The third session (day three) occurred one week after the second session, when the posttest (the transfer simulation) was administered. Participants were then debriefed about the actual nature of the study.

Data from the instruments and the game and computer-based word problems (controls) were input directly from the computer-generated files into SPSS. After data screening for outliers and normality, and after checking for appropriate statistical assumptions, ANOVA, bi-variate correlation, and chi-square analyses were performed to test the null hypotheses.

Results

Outliers were removed on a case-by-case basis. Assumptions for the statistical measures used were checked. All fell within acceptable parameters for the inferential statistics used. Tables 2 and 3 present demographic data. Tables 4 and 5 present means and standard deviations for transfer scores.

Table 2

Age, Gender, Grade, and Pretest Math Scores

Age		Gender		Grade	
M	SD	Male	Female	7	8
12.8	0.67	54	58	41	48

Table 3

Ethnicity of Participants

African American	Hispanic	Asian	Caucasian	Other
5	2	1	99	4

Table 4

Advisor Use and Transfer of Mathematics Scores by Condition

Condition												
	0 (n = 20)		1 (n = 17)		2 (n = 17)		3 (n = 12)		4 (n = 18)		Total (n = 84)	
Dependent Variable	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Transfer Score	.88	.68	1.23	.85	.76	.83	.71	.69	.92	.84	.88	.79

Table 5

Number of Successful Transfer Participants by Condition

Condition	Successful Transfer (n / %)
Control	10 (50%)
High-Contextual Advisement, No Competition (HCANC)	9 (53%)
High-Contextual Advisement, With Competition (HCAWC)	13 (77%)
Low-Contextual Advisement, No Competition (LCANC)	9 (75%)
Low-Contextual Advisement, With Competition (LCAWC)	11 (61%)

To control for differences in treatment time, only those participants who had completed the game or simulation (i.e., had not been forced to quit the game because of a computer problem or who had not accidentally exited the game prior to completing the problems) were included. This resulted in 16 participants not being included for analyses involving transfer. Table 6 presents the number excluded by condition.

Of those that were excluded, none had answered the first or second problem. Only one had used advisement (once) prior to exiting the game, and participants excluded were

evenly split between males and females. No other discernable characteristics appeared to differentiate these participants from those included in the analysis.

Table 6

Participants Excluded from Analyses Involving Transfer by Condition

Condition	n
1 (High-contextual advisement without competition)	1
2 (High-contextual advisement with competition)	3
3 (Low-contextual advisement without competition)	7
4 (Low-contextual advisement with competition)	5

Statistical analysis indicated no significant correlation for hypothesis one and no significant differences between groups for null hypotheses one through four. Null hypothesis five, that there would be no interaction of context of advisement and competition on transfer of mathematics scores, was examined using a 2 x 2 ANOVA. The analysis indicated no significant interaction of competition and context of advisement. A similar 2 X 2 ANOVA post-hoc analysis was run using a transfer score based solely on the ability to complete the problems in the game correctly. Because participants were not required to select formulae, it was felt that those who chose correct formulae may have done so by chance or some other unforeseen reason. Likewise, those who selected incorrect formulae may have realized their error but not bothered to then select the correct formula, choosing instead to work the calculations on their scratch paper. Levene's test of equality of error variances was significant, indicating the error variance of the dependent variable was not equal across groups. The cell numbers were large and equal. This analysis yielded a significant interaction of competition and context of advisement, F (3, 60) = 4.528, MSE = 3.024, p = .037 (see Table 7 and Figure 1). This null hypothesis was not supported. There was no alternate hypothesis proposed.

Table 7

ANOVA Table of Competition and Context of Advisement on Transfer Score

	df	F	Significance
Competition	1	.178	.674
Context	1	.414	.522
Interaction	1	4.528	.037

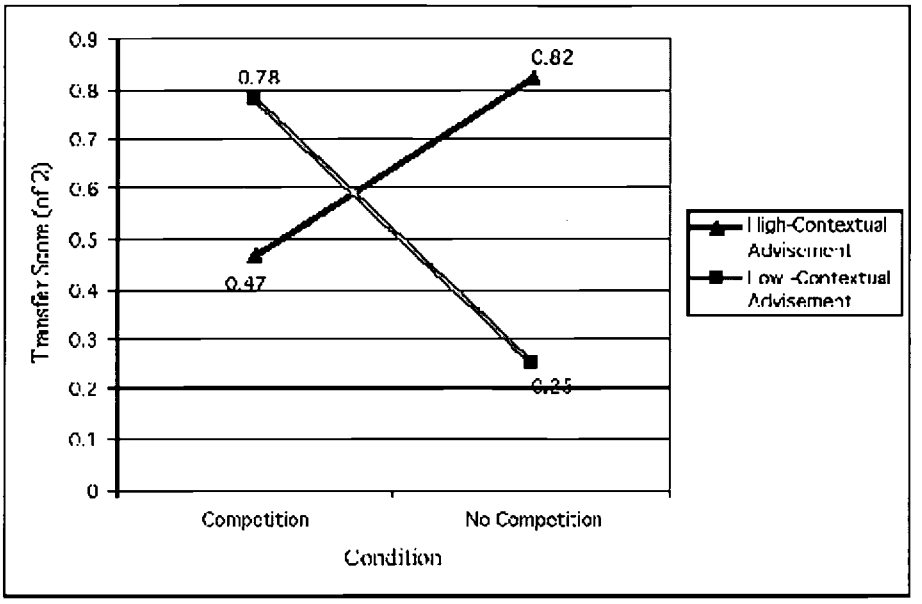

Figure 1. Interaction of competition and context of advisement on transfer of mathematics score.

Participants in the HCANC condition had higher transfer of mathematics scores than participants in the LCAWC condition. Participants in the LCAWC condition had higher transfer of mathematics scores than those in the both the HCANC and LCANC conditions. No other differences were detected between or among the other conditions.

To test whether pretest performance was responsible for any transfer effects, a chi-square of the two problems relating to area and perimeter in the posttest and in the game was conducted. There were no significant relationships between pretest and posttest scores on area and perimeter. No significant correlations were found between overall transfer scores and overall pretest scores, either. Finally, a regression of pretest scores on posttest transfer scores also failed to yield any significant predictive relationship.

Discussion

Alternate hypothesis 1, that participants who use advisement more often than others would have higher transfer of mathematics scores, was not supported. Participants who selected advisement more often than others were no more likely to have higher transfer of mathematics scores than were any other participants.

Advisement in this question was measured by the number of times the participants selected either the high-contextual advisement (video-based) or the reference book. Participants in the high-contextual advisement conditions had access to both the video-based advisement and the reference book of facts and formulae, while those in the low-contextual advisement conditions only had access to the reference book. Transfer was measured in a different context, at a different time, using different problems. The transfer variable ranged from 0 to 2, which may not have allowed for enough variability to detect

differences, at least with this number of participants. Additional research is needed over a longer period of time in order to allow for more transfer items and more practice opportunities. Also, the advisement itself was not piloted and evaluated using participants to determine if the advisement is effective in reformulating the problem space.

Alternate hypothesis 2, that participants in the high-contextual advisement conditions would have higher transfer of mathematics scores than those in the low-contextual advisement conditions, was partially supported. When transfer was measured solely by the participants' ability to solve the problem correctly, statistical analysis indicated that those in the high-contextual advisement conditions had higher transfer of mathematics scores than those in the low-contextual advisement conditions. This only occurred in the simulation condition (i.e., without competition). There was no significant difference in transfer of mathematics scores between high-contextual advisement and low-contextual advisement conditions under the competitive condition.

It may be that the presence of competition creates an affective environment in which high-contextual advisement cannot be fully attended to or processed because learners are concerned about the time they have taken (which is displayed on screen) and with beating the competitor. The competitor character in the simulation game in this study was always visible at the bottom right of the screen and randomly commented on how he or she (the competitor) was doing on the problem. Because participants were so conscious of the time factor, waiting for the advisement video to finish playing may have caused stress that interfered with accurate processing of the information. This may account for why the low-contextualized advisement in the competitive simulation game condition resulted in higher transfer of mathematics scores than it did in the non-competitive simulation condition, since learners did not have video advisement and were in control of how much time they spent in the reference book.

Alternate hypothesis 3, that participants in the non-competitive simulation game conditions would have higher transfer of mathematics scores than participants in the competitive simulation game conditions, was not supported. Participants in the non-competitive simulation game condition did best when they had access to high-contextual advisement. Participants in the competitive simulation game condition did best on transfer tasks when they had access to low-contextual advisement.

It appears that advisement should be modified according to whether competition is present or not. Games that make use of a time element may be incompatible with high-contextual advisement, which by its nature takes longer and may be perceived as less relevant. Alternatively, it may be that time constraints and competition may be better suited for building fluency and automaticity than for learning relatively new material and processes, as the transfer problems in this study might well be considered, given the application of learned material in a new setting or context.

Further research examining competition and cooperative learning might also help to explain these results, as some researchers maintain that cooperative learning is best for

promoting problem-based learning and transfer (Bransford & Stein, 1993; Dalton, Hannafin, & Hooper, 1989; Reid, 1992; Young, 1993).

Alternate hypothesis 4, that participants in the competitive and non-competitive simulation game conditions would have higher transfer of mathematics scores than participants in the control conditions, was not supported. No significant differences in transfer were found between the control conditions and the combined competitive and non-competitive conditions.

Given that there were no differences in transfer of mathematics scores solely as a result of either competition or context of advisement (main effects), it is perhaps not so surprising that controls did not differ significantly from the other conditions, although controls did have lower transfer scores than any other conditions, with a mean transfer score of .1335, while the transfer of mathematics scores for the other conditions ranged from .25 to .82. It may be that the measure of transfer in this study does not vary enough to detect differences because of a restriction of range. Transfer of mathematics scores ranged from 0 to 2, as they were based on the ability to select and apply the correct formulas for two problems. This was necessary because the intervention was limited by the schools to one 50-minute session, and situated learning is complex and requires elaborate processing. Given this and the fact that the problems themselves were complex (e.g., the area problem involved calculating area for unpainted surfaces (windows, etc.) on all walls and ceilings and subtracting that from overall area, which then had to be divided by the square feet per gallon of paint) more than two problems could not have been finished by the learners in the allotted time.

Limitations

The advisement itself was not validated for effectiveness with problem solving, although most (17 of 29) of those asked indicated that the advisement was good and was helpful or somewhat helpful (18 of 27). A pilot study to evaluate the effectiveness of the advisement would have made the study stronger. This study also did not examine qualitative measures regarding advisement. Debriefing forms asking about the qualitative aspects and affective responses to the instruction were distributed and collected later because there was not enough time in class, but the return rate was low.

The mathematics content of the simulation and game focused on solving two problems: one requiring area and the other requiring perimeter. While all participants were in seventh- and eighth-grade, and thus should have been familiar with these concepts, some were in semi-remedial classes and were still working with these problems, while some others were in advanced mathematics classes. Because participants were randomly assigned, ability was controlled for throughout the conditions, but this did introduce some potential error into the statistical analyses. It would have been better to train the learners to mastery in the content, and then run the intervention weeks or months later.

There was also not enough time available for the learners to work at their own pace. The school required that all sessions take place with intact classes, during the regular 50-minute class periods. As a result, some participants were unable to complete the game,

and most had little time for reflection and processing, focusing instead on getting the work done in the allotted time. Those who did not finish the game were excluded from the analyses to minimize error. This may have resulted in an overly conservative test for differences among groups. The fidelity of the treatment condition would have been higher had students been able to work at their own pace over a longer period of time. Because there was not enough time to do more than two problems, transfer of mathematics scores had a restricted range, potentially leading to low variance and validity for this variable. Participants may also have used advisement less because they wee concerned about running out of time.

Good interface design dictates that items and tools should be a logical extension of the metaphor being used. Accordingly, advisement was selected by clicking on a reference book (low-contextual advisement) or clicking on either the reference book and/or a walkie-talkie (high contextual advisement). In order to allow the learners to move about the room to measure and collect information, it was necessary to give the tools as small a "footprint" as possible. While this did not prevent users from finding or using advisement, it may not have been as obvious as prior research has suggested it should be (Dempsey & Van Eck, 1998). Consequently, advisement may not have been selected as often as it might otherwise have been.

Although participants had all received at least one year of training in the content, no external criteria of mastery was available. The study would have been stronger if it had been possible to provide training to mastery prior to the intervention. Finally, transfer may require longer periods of time and multiple practice oportunities and interventions (Gagné et al., 1992; Larkin, 1989). The intervention was limited in this study because the schools could only provide three class days out of their normal curriculum. The pretest instruments alone required one class period, leaving one class period for the game and one class period for the posttest. More interventions over a longer period of time for longer periods of time and the inclusion of qualitative measures may have produced larger changes in transfer.

Because participants were able to type in their answer to either of the two transfer problems in the game and in the posttest without doing any calculations on screen and without selecting any formulae or facts, it is possible some participants entered answers that amounted to guesses. It was not possible to determine with any accuracy whether participants were guessing at the answers because some may have used their scratch paper to do the calculations. While this scratch paper was retained by the researcher, it is problematic to evaluate these sheets for this purpose.

Conclusions

It appears that transfer can be promoted through computer-mediated intervention. One of the factors associated with increased transfer of mathematics scores seems to be whether and to what extent the learners avail themselves of advisement. Instruction that attempts to build in advisement should also explore ways to promote its use; the mere presence of advisement is not enough.

It also appears that contextual advisement can promote transfer under non-competitive conditions. High-contextual advisement in non-competitive conditions produced the highest transfer of mathematics scores. This is probably a function both of the newness of the instruction and of the complexity of the instruction as much as it is a function of the competition. Transfer is a form of problem solving, which is in this case a higher-order intellectual skill involving accurate problem space representation, recall of prior knowledge, and the formulation of rules about when and where to apply that knowledge. Accordingly, the cognitive load involved may be higher than for lower-level intellectual skills. Competition may create an affective state of anxiety and pressure that is detrimental to the processing necessary for transfer learning to occur. There were no detectable differences between high-contextual and low-contextual advisement conditions in the competitive simulation game condition.

In summary, for transfer training of this nature, non-competitive simulation games might be a better choice than simulation games that include a time-pressure factor. Advisement seems to be a good way to promote transfer. High-contextual advisement, that is, advisement that is metaphorically tied to the context in which it is found and is interesting, may be the best form of advisement. This is true regardless of the presence or absence of competition but perhaps particularly so for non-competitive simulation games. It tends to promote advisement use, which in turn is associated with transfer. Finally, simulation games seem to be capable of representing authentic contexts, with and without competition, and may be useful in promoting transfer in a variety of subject areas.

Future Research

Taken in conjunction with previous studies on advisement (e.g., Boulet, 1993; Boulet et al., 1990; Dempsey & Van Eck, 1998; Tennyson, 1980a, 1980b, 1981) it would seem that advisement can help learners manage their own instruction, increase performance, and promote transfer. The issue may no longer be whether or not advisement is necessary, but why it is, and how its use can be promoted. Future studies should examine other ways to promote advisement in simulations and games. An earlier study showed that making the advisement option obvious on the screen can increase advisement use (Dempsey & Van Eck, 1998), but this may be contraindicated in simulations and games, where a premium is placed on the immersive quality of the experience. It may be possible to build a kind of adaptive advisement system similar to that developed by Tennyson (1980a, 1980b), but which sends contextual prompts to the learner (e.g., after three errors and/or long periods of inactivity, voices come over the walkie-talkie asking if they need any help). A similar form of advisement has been utilized in a game called Hangtown (Doolittle, 1995).

Further research is needed to determine which factors of the high-contextual advisement used in this study are responsible for the effects observed. High-contextual advisement could be delivered by sound only with no loss in contextual relevance. This would help to determine what kinds of novelty or modality effects may be at work. Similar video clips of people who are generic advisors unconnected to the context of the simulation or game might also be useful.

Competition may inhibit elaboration. Future research might examine the role competition plays in elaborative processing. This should be done taking into account both time stress and competition as separate variables. While this study looked at competition as a factor, it might also be beneficial to examine cooperative learning in similar contexts. Research has shown that cooperative learning may be best for promoting transfer (Bransford & Stein, 1993; CTGV, 1992b; Keller, 1990; Young, 1993).

Further research should consider a mixed methods approach, using think-aloud protocols, observational measures, and oral debriefing to examine the why and how of the trends discussed in this study. Future research might also consider tracking errors and looking for patterns which might then be used to develop adaptive advisors. Future studies might also examine transfer issues in a more longitudinal fashion, perhaps over the course of one or more years.

Further research should be done to examine what kinds of gender differences there are in advisor preference and preference for competition. There was a participant/competitor gender effect; it may be reasonable to expect the same kind of relation between the gender of the participant and the gender of the advisor. It would be useful to examine whether this had any effect on advisor use, which was one of the more robust variables in this study. Such an effect might also impact affect as well. Future studies might provide different gendered advisors and run conditions where gender of advisor and participant were crossed.

The population for this study are private Catholic school students. There may be a variety of cultural beliefs and attitudes in this population which might be expected to impact the variables in this study. Catholic school students may be less likely to be questioning of teachers, thereby leading to differences in advisement use. Private school students may be more advanced and have better problem-solving skills than public school students. Private school students may also have higher computing skills and abilities because computing technology is more prevalent in private than public schools. Public school populations should be studied in similar fashion to strengthen generalizability of results.

The population under study was aged 12 to 14. The effectiveness of training and instruction using simulations and games should be studied at different age groups. Younger students exposed to this kind of training during instruction on the topic of interest, in this case area and perimeter, might be more successful transferring knowledge than those in this study, who were exposed after having studied the content exclusively in the abstract.

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Instructional Technology Innovation in the Liberal Arts Classroom: A Conversation with the Maryville College Faculty Instructional Technology (FIT) Fellows

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Abstract

Maryville College's first Faculty Instructional Technology (FIT) Fellows, who received funding and release time to develop technology-based instructional materials for their courses, are developing and implementing exciting projects in History, Religion, Freshman Seminar, and Political Sciences courses. In this paper, the Fellows describe their projects, share their experiences, and reflect on the impact of teaching and learning with technology.

Introduction

Maryville College is a four-year, independent liberal arts college located in the Appalachian East Tennessee town of Maryville. Enrollment is approximately 1,000 students most of whom are full time. There are 67 full-time faculty members.

In 1998, the faculty at Maryville College developed a "Vision for Instructional Technology" which conveys how technology can be used as a tool to further the educational goals of the college. In planning for and implementing instructional technology, Maryville College seeks:

- To engage students meaningfully in active and interactive learning situations and to provide access to a greater variety of learning opportunities,
- to ensure that all faculty and graduates can use information technologies to successfully access, critically evaluate, and creatively use information in teaching, learning, and research,
- to integrate new technologies and traditional styles of learning to enhance communication and to facilitate the learning experience,
- to develop faculty expertise in and vision for the use of instructional technology in their teaching and research while affirming the variety of learning styles and pedagogies that currently exist, and
- to help faculty and students respond with capability and discretion to changing societal notions of what constitutes minimal, necessary technological competence for an educated person.

Along with the vision, the faculty Instructional Technology Task Force developed a detailed five-year plan which includes the equipment, software and personnel needed to realize the vision. The plan was put into the form of a grant proposal and submitted to the U. S. Department of Education.

The vision is now rapidly becoming a reality thanks to a five-year grant from the U.S. Department of Education, Title III of the Higher Education Act, which commenced in October 1999. The annual award of $350,000 enables the college to purchase contemporary hardware and software tools, and to support a comprehensive program of faculty development through the funding of two full-time staff members.

Through the Instructional Technology Initiative every faculty member received a new computer and the Instructional Technology Center, housing a myriad of special computer-related equipment and software, was established. There is a "smart" classroom in each building and will be up to 10 portable "smart carts" which can be used in many classrooms to connect to the Internet and use modern projection equipment and software. Every department will receive specialized equipment and software for use in the instructional program. Finally, two new computer classrooms will be installed most likely using new wireless technology.

The heart of the program, however, is faculty development. There are multiple avenues for faculty development including group workshops, one-on-one assistance and support, and the Faculty Instructional Technology (FIT) Fellows program.

The Faculty Instructional Technology (FIT) Fellows Program

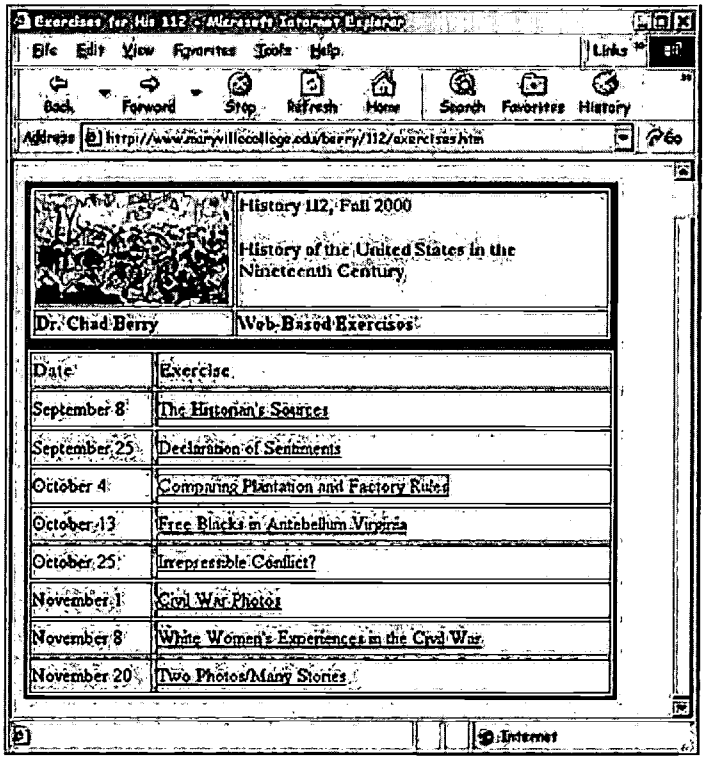
The FIT Fellows program offers faculty the opportunity to develop specialized technology applications for use in their teaching. Fellowship components include a summer stipend, one course release time, and funds for travel and equipment purchases. The Maryville College Faculty Development committee selects FIT Fellows based on a competitive review of proposals. New Fellows are selected each year and by the end of the grant period 46 of Maryville's 67 faculty will have had the opportunity to participate.

The first FIT Fellows were selected in April 2000 and have spent the last year developing instructional materials and integrating them into their classes. Innovative projects are underway in Religion, History, Political Science, and Freshman Research Seminar courses. In the pages that follow, each FIT Fellow will describe their project and share reflections on the meaning of the project for them and their students.

Developing a New Media Classroom - Chad Berry

My project this past year has been twofold. I attended the New Media Classroom workshop at Vanderbilt University titled "The Blues, Bluegrass, and Blue Suede Shoes: Southern Culture in the New Media Classroom." Once there, I realized that I would inject instructional technology into two courses that I teach: the History Survey and the Fall Freshman Seminar.

In the nineteenth-century U.S. survey, I began by putting all course materials on a class website (anchored, of course, on my own home page). The main change involved a number of web-based exercises that we would complete together, as a class, in the College's computer lab. Generally, students are paired on one computer so that they can work collaboratively. I've continued this approach this semester in my Twentieth-Century U.S. course.



In the fall freshman seminar, I used the online writing program, Speakeasy, to build and strengthen the kind of community that already exemplifies a small, liberal arts college experience. Over the summer, I sent my incoming freshman a letter introducing myself and explaining how to use Speakeasy. Their first assignment was to log on and introduce themselves. The response was terrific. On their first day on campus, students "virtually" knew one another, and it was inspiring to see them meet each other face to face after corresponding with one another for several weeks. Once classes began, I used Speakeasy to bridge the gap between Thursday and Tuesday by posting a discussion question and

requiring students to respond to me by midnight Sunday and to at least two others by midnight Tuesday. Both the web-based exercises and Speakeasy worked splendidly.

Impact on Student Learning

I believe my students have taken a renewed, more critical approach to learning because of their instructional technology experiences. Up front, I was quite candid with them, explaining that the whole purpose of my fellowship was to explore ways that instructional technology could enhance learning. At the end of each web exercise, we assess the experience by discussing if and how learning was enhanced and then examining the way technology supported the endeavor. The students are quite willing to speak honestly about the experience, yet the overwhelming opinion is that learning is indeed enhanced.

Impact on My Learning

My teaching has become reinvigorated in the process. I was at the point in my career when I was hitting my stride in the classroom; I was even becoming "comfortable," if not a little complacent in the classroom as committee assignments and other non-teaching responsibilities mounted. Exploring the ways that instructional technology can foster learning has taken away any complacency and reaffirmed my commitment to being the best possible teacher.

Surprises

One of the surprises I've learned is that students have moved far away from liking technology simply because it's "fun." My web assignments are tricky and challenging. Often, they force students to reconcile with ambiguity. Students have had difficulty with them in the past, yet they generally come to realize that they are learning something in the process. Using technology to teach the uncertainty and ambiguity of interpreting history has been a wonderful thing.

Future Plans

The only thing I'll do differently next year is inject more of the same, along with, of course, adding new technologies as they come online. Instructional technology is

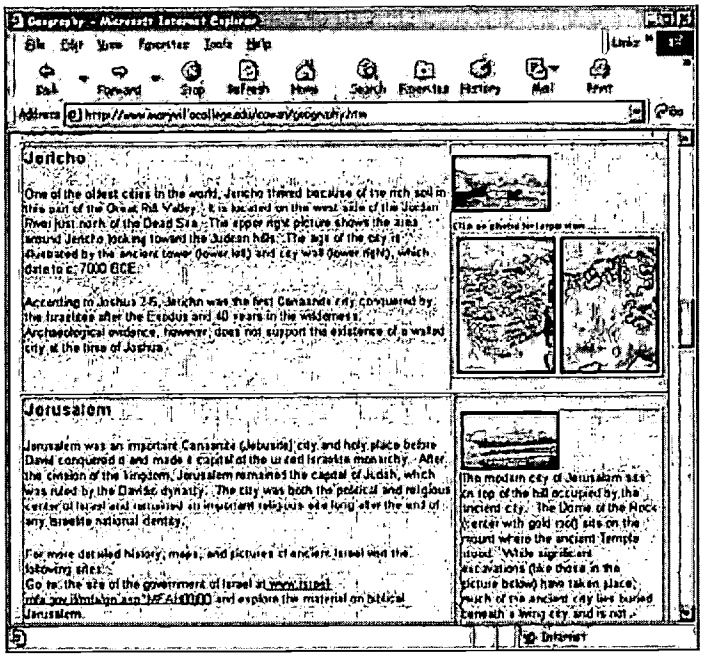
dynamic, not static. I'll continue to work to evolve my teaching and use of technology. It's impossible, I've realized, to go back to "old ways."

Building a Bridge with Technology - Peggy Cowan

As part of its General Education curriculum, Maryville College requires all students to take a course in Biblical Studies, either Introduction to the Old Testament or Introduction to the New Testament. This project is related specifically to Introduction to the Old Testament, although some of the materials are relevant to New Testament study as well.

A primary goal of the Biblical Studies courses and one of the major challenges for the instructor is enabling students to relate the Old/New Testament to its cultural context, i.e. the historical events and social and political realities that shape the writings. Students tend to assume that the narrative setting and historical context of the author are the same or that the intended audience is the contemporary reader rather than an ancient social group. In order to help students make the distinction between narrative setting and historical context and to recognize the vast differences in the biblical world and their own, significant instruction in history, social structure, geography, and archaeology is essential. Once those differences are clear, the task is to help students place the ancient texts in their ancient context and then to interact with them in a meaningful way. Bridging the gap between the worldviews of the modern western world and the ancient near eastern world is a major challenge.

Another issue that is important in teaching Biblical Studies is the differences in academic preparedness and learning styles of students involved. Because all students take the course at the freshman or sophomore level, these differences have a significant impact on their performance. Using web-based tools enables the instructor to provide students a variety of types of learning experiences that are not available through traditional texts, lectures, and classroom discussions.



This project consists of a web site that seeks to use pictures that illustrate the character of the terrain, in general, and specific geographic features, in particular; pictures that illustrate terms in a glossary; links to websites that provide additional pictures and illustrations, exposure to archaeological expeditions, maps, and other information; and a timeline that connects specific writings with historical events and periods. In addition, the website provides basic information about the course, a syllabus, study questions, exercises related to specific topics, resources on study skills, and a description of assignments.

Impact on student learning

Students have indicated that the visual nature of the website resources has been beneficial to them in recognizing the vast differences between their own world and that of the text. During the two semesters that the project has been in place, I have had students complete a web exercise and then write a paper about their learning experience. The kinds of things that they describe indicate that the use of the site has been very beneficial. I no longer have students talk about the wilderness as if it were the Smoky Mountains!

Impact on my learning

My comfort level and facility with technology in general, and the internet and websites in particular, has increased tremendously. I have learned a great deal about the kinds of information and tools that are available on the web and have increased in my understanding of how they might be useful in teaching and learning. It has encouraged me to be more imaginative and less text-based and linear in my approach.

Surprises

I have been surprised by the extreme differences among students in their facility with technology. Some of them need a lot of direction in order to negotiate the website effectively. Others are quick to follow and make suggestions for improvements. I have also been surprised at the lack of critical evaluation of material that they find on their own, even when that material obviously does not reflect the critical analysis we have

discussed in class. A very positive surprise has been the number of students who have been excited about the site and expressed their appreciation for a professor developing such a resource for them.

Lessons Learned

I am learning to do more introduction of the site at the beginning of the course and to provide some opportunities outside of class for students to explore the site with some help from a student tutor or me. I am also learning that exercises and web searches need to be carefully structured, because students are much too accepting of the material they find on the web.

Future Plans

Future plans include enhancing the current website, particularly the glossary, which remains incomplete to this point. I would also like to continue to research and develop a list of useful links and ways to integrate them into the course to make the readings more meaningful. Beginning in the summer of 2001, I will be working on a collaborative ACA project to develop a set of learning pathways related to this course. Those will provide more focused learning experiences for students. I have already been using the website to publish a syllabus, assignment sheet, resource page, and other materials for all of my courses. In particular, my upper level Biblical Studies course is using a website specifically designed to accompany courses about Jesus and the Gospels. My hope is that exploring the possibilities offered by instructional technology will push me to constantly revisit my approaches to teaching and keep my imagination and creativity alive.

Additional Thoughts

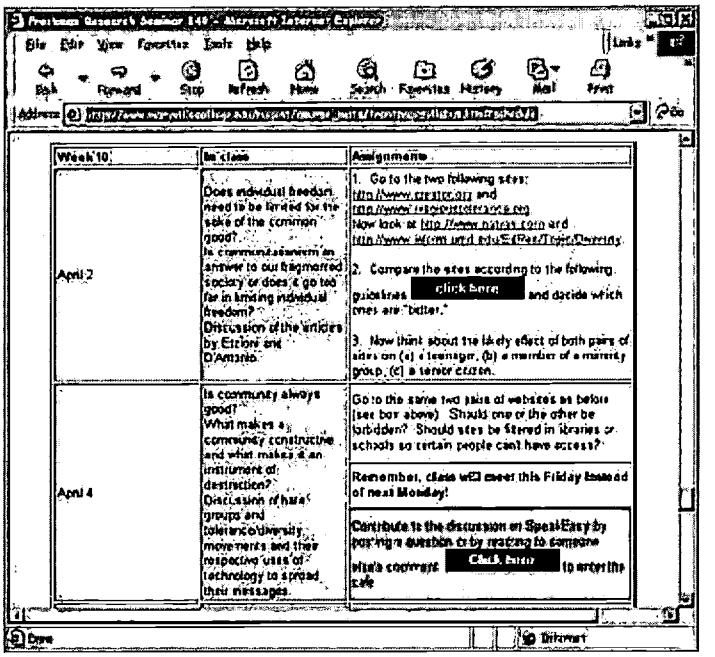
Participating in the FIT Fellowship project has been enriching for a variety of reasons. As mentioned above, I have grown tremendously in my facility and comfort with technology generally, and I am pleased with the impact on student learning thus far. However, I view this as a beginning point and recognize that, if technology is truly to enhance learning, I will need to continue to explore ways in which it can enable students to meet the educational goals of the courses I teach.

Making Connections in a Freshman Research Seminar - Chris Nugent

My project infuses instructional technology into the Freshman Research Seminar. The seminar is a two-hour general education course taught in 11 sections by an interdisciplinary group of faculty. All first year students take the class in the spring of their freshman year. I had two purposes in mind for the project. First, I wanted to create an *electronic space* for seminar faculty to exchange ideas, share best practices, and support colleagues who teach the course for the first time. My second goal was to provide an *electronic commons* for students and instructors to continue communicating beyond classroom time. The electronic space for faculty consists of a password protected materials archive and an online discussion forum. The materials archive provides access

to section syllabi, lecture notes, handouts, and other materials that faculty contribute for all to use. It replaces a stack of printed materials that I, the faculty coordinator for the group, would collect, keep current, photocopy, and distribute to new faculty.

The student electronic commons includes materials developed for my course section, such as the syllabus, a reading guide, an assignment guide, a research guide and links to online research support materials developed by the library. The syllabus is linked to the other online materials and includes several homework assignments that utilize web resources. There is also an online discussion forum for my section to continue discussions outside of class time.



Impact on student learning

It is a little early to say how the project impacts student learning since I am just four weeks into implementing it. Students seem at ease with online access to classroom materials. We are just now conducting our first online discussion and students who have not spoken up in class are contributing well-reasoned arguments. Where I see the greatest impact is during class. I am teaching in a technologically "smart" classroom that allows me to use a variety of online materials when I need them. For example, I pull up the syllabus frequently to help students see where we are and how the particular class session fits into the whole of the course. Also, I use PowerPoint to demonstrate concepts, log onto library materials to teach research strategies, show websites of varying quality to demonstrate critical evaluation skills of online materials, and plan to conduct a live chat session with a librarian during class to show students how readily available help is to them as they complete their research assignments.

Impact on my learning

I am having more fun preparing for class and during class than I did when I only used an overhead projector and blackboard. I use techniques that appeal to different learning styles more than in the traditional classroom where I relied more heavily on lecture. I also find that I am not afraid to try out new technologies on my own. The project has given me confidence in my own ability to develop online materials and has made me a more critical consumer of online products developed by others.

Surprises

Converting the materials for the online archive was more difficult and time consuming that I had anticipated. Since I did not become proficient in HTML but rather use the editor FrontPage, I had many issues with conversion and formatting of documents. Also, my database of materials grew rapidly and I had to pay much attention to file structure. I found that I could not include some useful materials in the archive because of copyright restrictions. It had been no problem to make photocopies and distribute those to faculty, but publishing that material on the web is a different matter altogether. At first, I did not take advantage of the visual possibilities the web offers. My product, being very text-based, was visually rather unappealing. Using color-coding and linking to external sites helped make it more interesting, but I know that my product cannot compete with commercially produced materials in terms of "entertainment factor."

Lessons learned

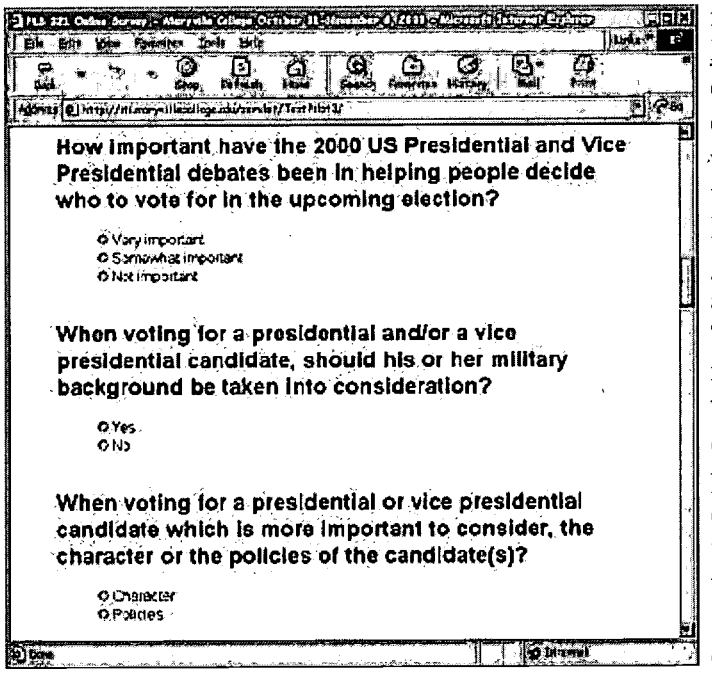
Using an editor to convert text materials into online format can be quite tricky and frustrating. If I ever built another large text collection, I would scan the original text or work with Adobe Acrobat. I would not spend much time on trying to enhance the originals with formatting and internal links. A course management system can do what I tried to do and much more. I would probably use such a system in order to save time and to produce a product that is easier to navigate than the one I created with FrontPage. Teaching with technology is more time consuming that teaching in a traditional classroom. It takes longer to prepare materials and my expectations of what materials to prepare are higher. Rather than showing a video clip I prepare a PowerPoint presentation with texts, images and sounds that I locate on the web and integrate into slides that must be legible and appealing. I am also learning as I teach this class that students bring a variety of technical skills. To some, technology seems like an additional barrier they must overcome in order to keep up with the class. Students need detailed instruction on what to do, and some students need personal assistance in accessing online materials. I also have to make special arrangements for a student with low vision. If I ever developed online course materials again, I would make a more conscious effort to make them ADA compliant.

Future Plans

I might experiment with software that allows virtual office hours. The library has just implemented a virtual reference desk where students can ask for research help in real time. This could be an effective way to provide remote help to students as they are working on research and writing projects. Another step towards technology integration would be to require online submission of assignments. Students could also use PowerPoint to present their research projects to their peers.

Voting & Polling Online - Mark O'Gorman

Students are exposed to survey research and public opinion polling in a variety of ways through telemarketing and polling results presented by the media. But with the advent of the Internet and the ability to use the World Wide Web (WWW) as a means to deliver surveys, the desire to capture and use this new technology in the classroom is tempting. Electronic and/or web-based voting, "Cyber-Voting", is quickly gaining use by businesses, media organizations, and political institutions. In April 2000, Arizona provided an on-line option for voters in its presidential primary, the first state to use such technology for an American election. Could some version of this technology be used in an educational setting as a means of teaching survey research, or to poll a campus community on a variety of issues?



In the Fall 2000 semester, I implemented an on-line internet based survey mechanism, or "virtual voting booth." Students in my American Political Process course used this tool to construct and conduct an on-campus, election-year College-wide poll and assess its results with relation to the 2000 US Presidential election. Teaching goals of the course were amplified through this project. The election process became more vivid, exposing students to the complexities of survey design, question wording and polling analysis as part of campaign strategy. Students were empowered to construct their own polls and assess surveys and results in both qualitative and quantitative ways, furthering their skills enhancement. The class surveys were posted to the College Voting Project web site.

Polling results mirrored the closeness of the actual 2000 US Presidential election, where one vote separated winners and losers among candidates selected in the survey. The ability to use the online survey data added one more "layer of learning" onto an already extraordinary election and post-election drama between US presidential candidates Bush and Gore.

A second phase of the development of this on-line voting presence at the College included co-designing the site and co-authoring additional polls with a senior student completing her thesis in her double majors of Environmental Studies and Political Science. The student, Katrina Atchley, used the survey mechanism separately to post questions dealing with the impact of environmental issues on the 2000 US Presidential election. Ms. Atchley's polls, conducted earlier in the semester, provided a test bed for the project, allowing pedagogical and technical questions to be reviewed positively and efficiently as the methodology section of the thesis.

Impact on Learning

Incorporating the FIT Fellow Online Voting Project into the course provided added applied and experiential richness to the course. Polling data from news organizations and polling services in the days leading up to the 2000 election was reviewed with a more discerning eye by students. Additionally, the experiential nature of constructing a poll helped students recognize the large amount of resources committed to campaigns. Early feedback from students echoed their appreciation to be exposed to new technologies, and gain a new understanding of elections and the Internet.

Surprises

It was surprising to find no central repository on campus for every student email account. Between different administrative offices creating accounts, students developing their own email addresses with private Internet Service Providers (ISPs) and gaps in organizing data, creating passwords for email accounts and setting up email address lists to send polling reminders became time-consuming. Fortunately, working at a smaller college allowed our class to gain access greater-than-average systems administration resources to resolve this issue.

Lessons Learned

The class gained a greater understanding of political issues and the use of quantitative information for a variety of uses. Because of the tumult surrounding the 2000 election, it was difficult to separate what Online Voting Project activities have more impact vis-à-vis the post-election Florida controversies. Next time, being more thorough in explaining the polling project, even at the expense of class time review topical material, would increase its utility within the course.

Future Plans

First, it is the expectation of each round of FIT Fellows at Maryville College to disseminate their knowledge to their colleagues and the larger community. Additionally, I hope to use the Online Voting Project technology in every course I teach to have students produce polls on course-related issues. Finally, the hope is that campus groups, student organizations and other potential users will utilize this technology.

Additional Thoughts

Two things. First, this project and class was conducted in a new "smart" classroom at the College, which was outfitted with computer technology, networking and projection abilities. This clearly added to the positive feedback of the course. Further use of this new classroom needs to occur in order to determine what projects and/or courses can best utilize this type of resource commitment. Is a "smart classroom" better than (just) a laptop and a computer projection system? Second, this project would not have come close to being accomplished-or with the success students suggested-without the work of Gina Roberts, Karen Wentz and the ITI staff. The ITI at Maryville College is a model of high-quality service dedicated to faculty-instructional assistance. It is a model that all colleges should replicate.

Conclusion

In addition to integrating technology into teaching and learning, these four FIT Fellows are enthusiastically sharing their knowledge and experience with colleagues at Maryville, visitors to campus, and at regional and national conferences. As the 1999-2000 FIT Fellows continue with their projects, they will be joined by the 2000-2001 Fellows who were selected in December 2000. These eight new Fellows are also excited about their projects and the positive impact they can have on teaching and learning.

Maryville College is truly being transformed as appropriate instructional uses of technology are spreading throughout the campus!

STUDENT AND FACULTY ISSUES IN DISTANCE EDUCATION

Mid-South Instructional Technology Conference

April 9, 2001

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Abstract

Occupational safety and health faculty and occupational safety and health professionals were surveyed to determine the considerations for a distance education-based graduate occupational safety and health program from the perspective of faculty and occupational safety and health professionals. Adequate time is the largest issue for potential students. Faculty need to be sufficiently trained in pedagogy, technology, and communications so that they have the same comfort level with this method of instruction as they do for the more familiar classroom. Additionally, technical and instructional support personnel need to be readily available to work with the faculty and support course development.

Introduction

Working professionals can find it difficult to pursue advanced degrees. This is particularly difficult for professionals working in relatively small fields such as occupational safety and health when only a small number of universities offer graduate programs. This makes it difficult for most safety professionals to pursue a graduate degree unless they are willing to terminate their employment and move to enroll in a traditional, classroom-based program. For many, this is too large of a sacrifice to make or may just not be possible.

Many educators are realizing that education can be conducted without having students sit in a conventional classroom and even without traditional lectures from professors. Performed properly, this concept of distance education might make it possible for safety and health professionals to continue work while pursuing a graduate degree. Thus, a distance education occupational safety and health graduate program would seem to be a good way to make education more widely available for working professionals.

This change from traditional classrooms to "virtual" classrooms will have a dramatic effect upon higher education and all who are connected with it (Connick 1997). Many

institutions and individuals are developing and conducting courses delivered via various methods of distance education. If distance education is to be the most useful to students, the focus needs to shift from individual courses to offering complete degrees.

The purpose of this study was to determine (a) the need for graduate occupational safety and health programs, as indicated by occupational safety and health professionals, delivered by means of distance education; and (b) the best means to deliver the program from the perspective of faculty and adult students. The study sought to document the need for occupational safety and health graduate programs delivered through distance education, to identify the required resources and considerations, and to make recommendations to guide the development and delivery of such programs. This research was intended to provide insights for students, faculty, and administrators into the advantages and disadvantages of distance education graduate programs and areas of concern that must be addressed if such programs are to meet the needs of students and requirements of faculty.

Procedures

Two surveys were used. The Safety Professional Distance Education Survey was sent to 500 practicing safety professionals who had bachelor's degrees, the potential audience for graduate level distance education programs. The Faculty Distance Education Survey was sent to all 108 faculty members in the degree-granting graduate occupational safety and health management programs from the 17 colleges and universities offering graduate degrees.

The Faculty Distance Education Survey was designed to learn about attributes of faculty including demographics, how willing to change they were, their level of concern about distance education, their attitude toward distance education, and how comfortable they were with technology. The Safety Professional Distance Education Survey gathered demographic information about the respondents, their attitudes toward technology and distance education, and what attributes a distance education program will need in order to best meet the life style and needs of the students.

Findings

Demand for distance education. Research question 1 asked: "What is the demand for master's degree occupational safety and health programs to be delivered through distance education by occupational safety and health professionals in the United States with bachelor's degrees?"

A slim majority of respondents to the Safety Professional Distance Education Survey (n = 87, 53.4%) agreed with the statement, "I would be interested in a distance education graduate program in occupational safety and health if a program was currently available." Forty respondents, or 24.5%, indicated that they would not be interested and 36 respondents, or 22.1%, said that they were unsure if they would be interested. Eighty-one percent (n = 132) of respondents agreed with the statement, "If I was going to pursue a master's degree in occupational safety and health, I would be interested in a good distance learning program if it was available." The correlation between the two statements was significant.

Program attributes necessary for students. Research question 2 asked: "What are the necessary program attributes such as administrative policies, access to hardware and software, and instructional practices for working professional students to participate and learn effectively in occupational safety and health graduate courses delivered through distance education?"

The student audience for this program is comprised of working safety and health professionals. Results from the Safety Professional Distance Education Survey indicated that the mean age for those interested was 42 years and that 88.5% were male, 90.8% were white, and they worked on average no more than 50 hours a week. Only 13.8% of those responding that they were interested in such a degree program worked more than 50 hours per week. Another area affecting time available for pursuing a degree is traveling, and 56.0% of those interested said they traveled 1 to 6 days per month. The average number of days spent traveling per month was 5.3 for all respondents and 5.6 for those who indicated they were interested in a distance education program.

Even though it may seem to be the antithesis of what distance education is supposed to be about, it may be necessary to have students come to a central location in order to meet necessary hands-on requirements. With this in mind, survey questions were asked to gather information about coming to campus. The first question asked, "If there was a requirement to travel one time 600 miles, for 1 to 2 weeks' duration, to complete your degree would you still be interested in the [graduate safety and health] program?" Of those interested in pursuing a graduate degree by means of distance education, 64 or 73.6% said yes. The second question, "If there was a requirement to travel at least 600 miles to campus as part of the degree requirements what would be the maximum number of times you would be willing to do this?," had four response choices ranging from one to four times. Responses indicated that a shorter period of time was preferred, with one time (45, or 52.3%) and two times (29, or 33.7%) accounting for 86.0% of the responses. The third question asked, "If you were required to travel to campus to accomplish certain degree requirements that could not be done via distance learning what would be the most time that you could reasonably stay at one time?" Responses were either 1 week (73, or 84.9%) or 2 weeks (13, or 15.1%). In summary, it appears that potential students are reluctant but willing to travel to campus to complete specific degree requirements. However, if necessary, such travel is preferably only one time and no more than two times for the entire degree program and for no more than 1 week at a time.

Potential students want a program that is recognized as being of high quality. This is evident in the comments made in the open-ended questions as well as the responses that indicated that 97.6% of respondents thought it was important that the program be accredited.

Communication appears to be very important to potential students. Those who believed it is important to be able to communicate with the instructor totaled 93.0% of respondents. Connected with this result is the finding that 91.9% of respondents thought it is important for the instructor to have telephone office hours. Additionally, 78.0% of respondents indicated that it is important that the instructor respond to e-mail the same

day it is sent. Students were asked to indicate by ranking from 1 to 5 their preferred method of communication with instructors. The composite rankings, in order, were e-mail, phone, fax, mail, and in person. Confirming this preference for e-mail were questions that indicated a high level of comfort with using e-mail to communicate (91.9%) and with an e-mail-based course (87.3%).

Findings indicated that a slight majority (53.5%) of respondents believe it is important to meet with faculty at least once in order to get to know them; however, these potential students are unsure of the importance of meeting fellow students for peer support (Important = 19.8%; No opinion = 41.8%; Unimportant = 38.4%). Similar issues and responses are those indicating a lack of importance in interacting face-to-face with faculty (Important = 36.1%; No opinion = 36.0%; Unimportant = 27.9%) and interacting face-to-face with fellow students (Important = 24.1%; No opinion = 34.9%; Unimportant = 40.7%).

Respondents indicated that 86.1% believe it to be important that the course work relate to their job and that classes be flexible. Flexibility was considered important by 95.3% of the respondents, and affirmed by the number of remarks that stressed this point in responses to open-ended questions. Comments to open-ended questions indicated a particular need for flexibility regarding time because of all the other demands that professionals have on their time including work, travel, and families. Also related to flexibility, respondents indicated that they would prefer that the maximum amount of time necessary to complete course requirements would be 2 years or less (58.6%); 3 years was selected by 29.9% of respondents.

Respondents were asked questions regarding various methods of distance education teaching and were asked how comfortable or uncomfortable they were with these methods. The lowest response was for meeting at an Internet site at a specific time (62.1%). Meeting at a specific time would make a course much less flexible because of the expectation to be at a site and to spend a regular amount of time there, as is required by most classroom-based courses. Respondents (87.4%) indicated they would prefer evening classes between the hours of 6:00 p.m. to 10:00 p.m. if they were required to do course work at a particular time. The highest comfort level among respondents was with using Interactive computer programs (93.1%), videotape- and print-based courses (90.8%), and using an Internet site on their own schedule (88.4%).

The most important support services according to survey respondents are computer support (80.2%), bookstores (63.9%), library (62.8%), and registration (58.2%). Significantly less important were opportunities to interact with other students for peer support (34.4%), and student counseling services (29.1%). To properly serve distance students, a university will need to consider and address these students' specific needs.

Faculty issues. Research question 3 asked: "What human and technical issues (training, support, hardware, software, and technical knowledge) will be faced by faculty who will develop and deliver occupational safety and health graduate education programs using distance education?"

Faculty respondents to the Faculty Distance Education Survey were predominately male (82.1%), White (89.3%), and between 46 and 55 years of age (52.7%). A majority of these faculty (64.2%) possessed a doctoral degree, had 11 years or more of teaching experience at the college level (64.3%), were tenured (64.3%), and held one of the professor ranks (85.6%). Additionally, the majority (53.6%) were likely to have had some experience with distance education by having taught at least one course via a distance education means.

The respondents indicated that they were comfortable using e-mail (83%) and were generally comfortable with the concept of instructing via distance education (67%). There were 10 survey items that sought to identify how receptive to change the respondents were; results indicated that these faculty were receptive to change, with the lowest indication being 66.1% and ranging up to a 98.2% indication of being receptive to new ideas and concepts.

Respondents were asked questions regarding various methods of distance education and asked how comfortable or uncomfortable they were with these methods. Some methods were more favored than others. The highest level of comfort (66.1%) was identical for instruction and lessons being sent using e-mail and using preprogrammed interactive computer-based lessons. The next highest level of comfort (62.5%) was indicated for students being required to go to an Internet site at a specific time once a week for interaction with the instructor and other students through video or audio communications and e-mail, and requiring students to go to an Internet site once a week at a time of their choosing and spending about 2 to 3 hours reviewing instructor lectures through video or audio communications. Of the choices given, these two methods are most similar to traditional classroom teaching methods.

The other choices, regarding methods of distance education, in order of preference were videotape- and print-based courses (60%), videotape-based courses (58.9%), Internet-based video courses (53.5%), mail correspondence courses (51.8%), and Internet-based audio courses (42.9%). The two methods that garnered the highest level of discomfort among faculty respondents were Internet-based audio courses (44.7% uncomfortable; 12.5% undecided) and correspondence courses where everything is written and assignments are sent back and forth using the mail (44.6% uncomfortable; 3.6% undecided).

Six questions on the faculty survey addressed how concerned the faculty were about distance education. Responses indicated that faculty had some knowledge about distance education courses (76.8%), and that they are concerned about how distance education is going to affect them personally (85.7%) and what their institution is going to want from them (76.4%). These responses indicate that the respondents are concerned about distance education and how it will affect them.

Faculty indicated that they believe that distance education is important to their department (76.8%), their university (82.2%), and to the future of education (85.7%); they also believe it can expand learning opportunities (94.7%). Responses to open-ended

questions also indicated that faculty felt that distance education has advantages for non-traditional students and has the potential to increase enrollment. Additionally, respondents indicated that they would be interested in teaching by distance education (75.5%); this was further reinforced by 83.5% indicating that their attitude toward distance education is positive and by faculty responses made to the open-ended questions.

Through the open-ended questions respondents also indicated their concerns about distance education. These concerns included lack of interaction with students, inadequate time to develop courses and teach, inadequate technical and administrative support, concern about course quality, concern about appropriate compensation, concern about university administration support and commitment, and pedagogy.

Conclusions and Discussion

Students

Faculty and students comprise the two of the three groups that are most directly involved in an individual's education and have the most direct interface with each other. Thompson and McGrath (1999) stated that the infrastructure to support distance education must be as solid as that supporting resident instruction. This means that the third group, university administration, needs to establish policies and practices that enable and encourage faculty and students to maximize the educational experience and to be especially careful that policies and practices do not get in the way of education.

A majority of the working safety and health professionals who responded expressed an interest in a graduate-level degree program in safety and health taught via distance education. Thus, it can be concluded that a potential demand exists for such a program. Such interest by working adults in distance education-based programs was supported by Gibson's (1992) finding that adults tend to choose educational options delivered via a means that allows them to minimize disruption of their lives including their employment and family.

The single largest group (slightly over one third) within those interested in a graduate program has their bachelor's degree in a safety-related field. These individuals are well-positioned to enroll directly in an accredited graduate curriculum. A little over one third have degrees in other fields such as industrial technology, engineering, and various sciences. These individuals would most likely have to take a few undergraduate courses before being admitted into a graduate safety and health program. The third group was a little under one third of those interested, and they had degrees in various business and humanistic studies. These individuals would likely have extensive undergraduate requirements to meet before they could pursue graduate study in an accredited safety and health program. Universities setting up distance education programs will need to understand the wide variance in educational background of those working in the safety and health field, be very clear about requirements in any promotional materials, and have formal, justifiable evaluation systems in place. This is critical for students and for the reputation and quality of the program as well as being important to ensure meeting

accreditation requirements. Additionally, entry requirements may require students to take prerequisite courses, perhaps from other institutions. This raises the issue of quality of these courses and what will be accepted and what will not. Formal open procedures and policies will need to be established to avoid problems.

Respondents indicated that program flexibility is very important to them. Although the responses indicated that flexibility meant different things to different people, a common word used with flexibility was *time*. To illustrate, respondents indicated that job requirements necessitate working more than 40 hours, although few exceeded 50 hours per week. Traveling for business is also a common necessity, requiring on average 1 to 6 days per month. Those interested in pursuing a graduate degree are very concerned that the program be flexible from a time perspective. O'Malley and McCraw (1999) pointed out that a major advantage indicated by students who have taken distance education courses is the flexibility it gives them. Gibson (1992) indicated that adult learners prefer to work on their own, at their own pace, and to not be overloaded because of their other obligations. The respondents in the current study appear to fit this profile in their desire for flexibility. Schrum and Benson (2000), in a study of a MBA distance education-based program, discovered that the working students in the program indicated that they struggled to balance the time required in their course work with their professional and personal lives and that this caused them the most stress. To provide flexibility, it will require a different mind set from a course administration point of view. Deadlines may need to be more flexible and will have to be established well in advance and made very clear. Another aspect of time is the time required to complete the program. Students would like to complete degree requirements within 2 years. Strict long-term planning will be necessary to lay out the curriculum so that this can be possible.

Although the majority of respondents indicated they had access to a college library, a safety and health curriculum requires access to books and references that are not found in typical college libraries. The library at the host institution will need to have multiple copies of key material and establish access and loan procedures that meet the needs of distance students. Much of this material could be made available through the Internet, but access to appropriate databases would need to be established. This will require close coordination between faculty and library personnel to ensure that appropriate material is available.

Respondents overwhelmingly indicated that they have access to computers, the Internet, fax, and e-mail. Clear and definite information will have to be provided as to what technology is expected to be used by students, and faculty will need to adhere to those standards. In some cases, students will need to purchase equipment or software and they should not be expected to purchase additional equipment just because one faculty member decides that he or she wants some additional capability.

It may be necessary for students to come to campus or other central location in order to accomplish hands-on requirements such as those that are usually performed in labs. Potential students indicated that they are willing to travel to fulfill this need, but this travel should be as little as possible, ideally only once for the entire degree and absolutely

no more than twice. Additionally, when traveling they want to stay away from home no more than 1 week. Requiring students to travel defeats much of the purpose of a distance education program from a student's point of view. Ideally, the program should be set up to require students to travel no more than once and for only 1 week to meet all on-campus requirements. This will require a careful review of necessary lab requirements and an efficient use of time to meet them.

Potential students indicated that they want a program that is recognized as being of high quality. They also indicated that it was very important that the program be accredited. These results indicate that an institution that already has a conventional accredited graduate program that is widely recognized within the field as being of high quality, would be strongly considered by individuals who want a graduate degree, as long as the distance education program is perceived as being of equal quality. Such an institution would have a major marketing advantage over other institutions who were not accredited or did not have as strong a reputation. Efforts should be made during program development and throughout implementation to not sacrifice quality.

Quality is hard to define and much of what is perceived as quality is in the eye of the beholder. Because of this, program administrators and faculty should be sensitive to the comments and opinions of potential and actual students in order to ensure that the program's high quality is being received as it is intended. That quality can be a major issue with potential students was confirmed by a study performed by Perdue and Valentine (2000) of certified public accountants that showed this group's concern about quality was actually hindering pursuit of distance education by this group. Quality issues, real or perceived, must be properly addressed.

Communication is very important and is extra critical in a distance education program where face-to-face communication is not possible. Nixon and Leftwich (1999) found that constant and timely communication is crucial and that students have a need to know that someone is listening and that they have been "heard." Students want instructors to have telephone office hours and to respond quickly to e-mail. E-mail followed by phone and fax were the preferred means of communication; procedures to handle what could become a high volume of communication will need to be established and followed.

Potential students indicated that they would like to meet faculty at least one time. Being able to "put a face" to a name and to a communication could be an important component of quality and enhanced communications. One example of what could be done is to put pictures and biographies on a web site where students could access them. Another method that might be used is to bring all students starting the program to campus for approximately 1 week to meet faculty and other key personnel and to fulfill hands-on requirements as previously discussed. This would also allow the students to meet each other and should enhance attachment to the department and the university.

The potential students who responded in this study did not reject any of the principal methods of conducting classes by means of distance education; however, they thought less of synchronous courses. Emphasis should be placed on conducting courses that

allow maximum flexibility, including varying work schedules and travel. Asynchronous as opposed to synchronous courses would better meet this requirement. If synchronous courses are conducted, potential students prefer evening hours.

Potential student respondents in this study felt that the most important student support services were computer support, bookstore, library, and registration. Counseling and peer interaction were much less important. It will be important to consider the different needs of distance students from on-campus students. Anything that the student will need to do must be able to be done easily without coming to campus. To address this need, policies and procedures may have to be changed, hours modified, and services made available via the Internet and other means. Additionally, the importance of various support services will likely be different for distance than for campus-based students. For example, computer help desks may need to be open longer hours and have more people assigned to them or the bookstore may need to hire more personnel, perhaps even install a Internet-based purchase system or toll-free number ordering system to handle book requests.

Faculty

Faculty demographics in this study followed the safety professionals' demographics in that the respondents were predominately male, White, and 46 to 55 years of age. These faculty respondents tended to hold tenured positions at one of the professor (assistance, associate, or full) ranks, and a slight majority had taught at least one course via distance education. The faculty indicated that they were generally comfortable with technology and with the concept of distance education and that they were generally receptive to change and to new ideas and concepts. This being said, that does not mean that faculty were totally comfortable or understood distance education methods and requirements. Two of the higher rated preferred methods of teaching were those requiring students to go to an Internet site at a specific time once a week for interaction with the instructor and other students through video or audio communications and requiring students to go to an Internet site once a week at a time of their choosing and spend about 2 to 3 hours reviewing instructor lectures through video or audio communications. It is not surprising that these methods would be more comfortable for many faculty; they are just adaptations of the typical traditional classroom. Williamson, Bernhard, and Chamberlin (2000) found that faculty need to use appropriate pedagogy in consideration of the results desired and the technology available, and to not just try to modify a classroom approach. Faculty will require training and support to be able to effect this change.

Faculty respondents in this study indicated that they had some knowledge about distance education and were concerned about how distance education will affect them. They believed that distance education is important to their department, their university, and to the future of education. They also felt that distance education has the capability of expanding learning opportunities, especially for nontraditional students, and has the potential to increase enrollment. Faculty, whether they had taught by distance education means before or not, indicated that they had a generally positive attitude toward distance education and would be interested in teaching by via distance education. Those who had previously taught a course by means of distance education were more positive about

teaching another course than were those who had not taught via distance education means. This is consistent with Fuller, Norby, Pearce, and Strand's (2000) research, which found that most faculty who had previously taught an on-line course were willing to do so again.

Faculty respondents in this study also had concerns about distance education. These concerns included lack of interaction with students, inadequate time to develop courses and teach, inadequate technical and administrative support, concern about course quality, concern about appropriate compensation, concern about university administration support and commitment, and pedagogy concerns. These types of concerns are common with faculty; similar concerns have been found in other studies (Botsch & Botsch, 2000; Rockwell, Schauer, Fritz, & Marx, 1999; Schifter, 2000).

Recommendations

Based upon the findings of this study, the following recommendations are made for occupational safety and health educators who want to develop and deliver graduate education through distance education:

1. Institutions need to be very clear and up-front in marketing and promotion about what is expected of students and what distance education is. Too many students have an unrealistic expectation of distance education, believing it will be easy or underestimating time requirements for completion.

2. Technology should never get in the way of instruction. Students will need to be trained in available technology as well as be provided quality computer support so that they can focus on the instruction and not on the technology. It may be necessary to assess individual students' level of technological knowledge and train them where they are deficient. Additionally, an instructor will likely be the first person a students contacts when experiencing a problem. Instructors must be trained on common problems and solutions in order to help students.

3. Considering the needs of distance students must be a primary concern. Care should be taken to not try to just plug the distance education program into existing administrative policies and procedures. Entry requirements and academic standards should be the same for distance and on-campus students. Policies and procedures will need to be established for acceptance of transfer credit and for evaluation of previous work.

4. Faculty should be encouraged to participate in delivering courses via means of distance education. To accomplish this, faculty need to be given training in pedagogy, technology, and communications. Faculty need to be sufficiently trained so that they have the same comfort level with this method of instruction as they do with more familiar, traditional classroom instruction methods. Technical and instructional support personnel need to be readily available to

work with the faculty and to support course development. It also would be helpful to establish faculty mentorship efforts, so that those faculty who have experience with distance education can assist those who do not. Faculty members' distance education efforts need to be recognized by university administration in their promotion and tenure decisions as well as in administrative decision regarding faculty financial rewards, release time, and honor systems.

5. Finally, further research needs to be focused on specific technologies and pedagogical issues in distance education in order to develop best practices for course delivery.

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Copyright: Fair Use or Foul Play

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Have you lost track of what is going on in the world of copyright? Misconceptions of fair use in copyright abound. To avoid legal hassles and lawsuits, people must understand copyright law/guidelines and realize that as individuals they are subject to lawsuits as individuals, as well as opening up their institutions to legal repercussions. Myths, examples and solid information will be shared and discussed.

Copyright in the United States is not a new issue, since the first law actually dates back to 1790. What is new in the area of copyright law is the realization that with the advent of the information age knowledge of copyright is becoming even more critical. Today, people in all professions need to have a complete understanding of copyright. Currently, the Copyright Act of 1976 and the Digital Millennium Copyright Act are the most important pieces of legislation to understand.Copyright Myths/Misconceptions

When working with copyright, it is important to distinguish between myth and fact. Some of the myths that many people subscribe to include: if it is on the Internet, it is not copyrighted; if the copyright notation is not present, the material is not copyrighted; if the material is for educational purposes, copyright does not apply; and any material can be included on a web page without permission. It is time to dispel/correct these myths. It is critical to realize that the copyright notation is no longer required. So it is more judicious to acknowledge that everything is copyrighted unless otherwise noted. It is also important to be aware that while the Internet is the "wild side" of the Information Age, copyright still applies. Finally, "Fair Use," although it covers educational purposes, does not give people unlimited opportunities, but rather, it provides guidelines for use within the educational setting.

Fair Use for Educators

Fair Use for educators gives us a balance between access to materials/information and protection for creators. This is one of the most frequently misunderstood and

misconstrued areas of copyright. The following points comprise the Fair Use Doctrine, and all four points must be evaluated before determining Fair Use:

- Purpose and character of work
- Nature of the copyrighted work
- Amount and substantiality
- Effect upon potential market.

Purpose and character of work
Congress favors educational use over commercial use when determining Fair Use. It is more likely acceptable when the copyrighted work is altered into something new or creative, including quotations or graphic images into a PowerPoint presentation. However, alteration does not need to occur to still allow for use under this point.

Nature of the copyrighted work
Works that are factual in nature are less likely to be challenged under this point in the Fair Use Doctrine. Fiction or entertainment types of copyrighted materials can be more problematic and may require special consideration. Another example may be consumable materials such as workbooks; these are less likely to meet the test of Fair Use than printed factual texts.

Amount and substantiality
Amount is measured both quantitatively and qualitatively. Although no EXACT quantity exists in the law, there are some suggested guidelines to follow, often referred to as the "Ten Percent Rule." Note the following suggested guidelines:

- SINGLE copy of a chapter in a book; article from a periodical/newspaper, short story, short essay, short poem; illustration from book, periodical, or newspaper.
- ONE illustration from book/periodical; 250 words from poem, 10% of a piece of prose up to 1,000 words.
- No more than ONE short poem, article, story, essay, or TWO excerpts from the same author.
- MULTIPLE COPIES cannot exceed the number of students in the class, nor more than NINE instances of multiple copyright for one course during one class term.

IMPORTANT consideration/factor: if the multiple copy request meets the "test of spontaneity" (didn't have time THIS FIRST TIME to get copyright permission), the multiple copies can be made; any further duplication/distribution needs permission.Effect on Potential Market. Effect on the potential market is a bit more complicated than the other three criteria. Termed the "fuzzy area," a generalization can be whether it impacts the copyright holder's potential for revenue. A person cannot create or replace an anthology or compilation of copyrighted works; this is an issue where faculty and copying services frequently have conflicting agendas. Also, effect on potential market does not change if the work is out of print; copyright permission still must be requested by contacting the publisher (in most cases).

Faculty Perspectives of Copyright

Faculty can protect themselves, the institution, and their students by understanding and following copyright laws and guidelines. For example, apply the Fair Use Doctrine as outlined above, with the understanding that one copy of a copyrighted printed document can be made for personal use and files.

Reserve materials in the library is an issue which many faculty overlook, but the librarians must comply with copyright law. For example, materials may be put on reserve WITHOUT PERMISSION for only one term; this includes all types of materials (i.e. books, copies of articles, multimedia materials, etc.). In subsequent terms, either purchase of the materials or permission must occur. Electronic reserves opens a new area for copyright law to be interpreted and implemented. The same requirement regarding use for one term without permission is being interpreted by many people as applying. Institutions and publishers have begun to address this area, and various electronic access for copyright permissions is now available.

Non-print materials (videotape/music) follow a prescribed set of guidelines. The finished product must be for educational purposes, used that instructor's own classes, falls within the two-year limit on materials and use, includes face-to-fact instruction or directed self-study, and may be included in professional portfolios and peer presentations. With all of the above, the Ten Percent Rule (a gentleperson's agreement, not a law) applies to use WITHOUT PERMISSION.

- Motion media – 10% or 3 minutes, whichever is less.
- Text material – 10% or 1000 words, whichever is less
- Music, lyrics, and music video – up to 10%, but no more than 30 seconds.
- Illustrations/photographs – May be used in their entirety, but no more than 5 images by the same artist/photographers. From a collective work, 10% or 15 images, whichever is less.

The WWW/Internet still requires copyright law to be followed; however, linking to other sites/URLs is allowable. Although asking permission to link is not required, it is a common courtesy and is frequently requested from the site creator.

Off-air videotaping adds its own dimension to copyright. We usually think of this type of recording as making a copy of a television program. There are, however, certain restrictions and rules which must be followed. An off-air video recording is designed for one-time instruction, and the tape may be retained for 45 days and then erased. This is an area about which faculty are not aware or elect to conveniently ignore/forget. The copyright notation must always still be present on the copy. After 45 days, either permission should be sought or a copy of the work should be purchased. In respect to off-air videotaping there are certain restrictions. You may not tape premium channels (HBO, Showtime), alter original content, exclude copyright notice, record in anticipation of need, or retain after 45 days, unless indicated otherwise, and may include, agreements with certain channels or U.S. government works.

Use of videotapes is yet another issue. The tapes must be curriculum based and relevant to the course objectives; shown only to students; shown by either a teacher, student, or guest presenter; and shown in an academic setting where no fees are being charged to view the videotape.

Finally, as mentioned earlier, materials/course packets continue to be perceived as an annoying hurdle to be overcome. The rule of thumb is quite uncomplicated – if faculty want to include copyrighted materials within a course packet, permission must be obtained and appropriate fees must be paid. The "test of spontaneity" does not apply with course packets.

Student Perspectives of Copyright

The majority of copyright law, which covers faculty, applies also to students. Students still must adhere to Fair Use, the two-year time limit on materials, and the 10% rule on portion limits. However, students have a little more latitude when creating their portfolios or other job-seeking materials, which are related to a specific course where creation of materials was a requirement and students did not request permission at that time. For example, if a student is required to create a web page for a course and uses copyrighted images, the project can be retained for two years. This has been a major source of confusion and will continue to be so until more concrete guidelines are established.

Getting Copyright Permission

Getting copyright permission to use materials may be easy or it may be difficult. A rule of thumb – do as you are instructed. Most print and non-print material will provide the contact name and address (sometimes telephone/fax number) of an office or person who can authorize permission to use copyrighted materials. For print materials, the requester should identify the author, name of the material (title and source), page numbers, number of students, term(s) to be used. Be prepared to pay for copyright permission, although some publishers will not charge a fee. Some publishers have elected to have all requests handled through Copyright Clearance Center or other designated source. Always maintain a detailed paper trial of any communication regarding copyright.

Things to Watch

Continuing breaking news will be seen very soon regarding Napster, Uniform Computer Information Transactions Act (UCITA), distance education, and the Digital Millennium Copyright Act update. As continuing legislation and lawsuits evolve, copyright law as we know it today will be clarified without losing Fair Use and thereby undermining the pillar of education: access to and use of information for research and teaching purposes.

Selected List of Useful Readings

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Halbert, Debora J. Intellectual Property in the Information Age: The Politics of Expanding Ownership Rights. Westport, CT: Quorum, 1999.

Heinich, Robert, Michael Molenda, James D. Russell and Sharon E. Smaldino. Instructional Media and Technologies for Learning. 6th ed. Columbus: Merrill, 1999.

Sinofsky, Esther R. A Copyright Primer for Educational and Industrial Media Producers. 2nd ed. Association for Educational Communications and Technology, 1994.

Strong, William S. The Copyright Book: A Practical Guide. 5th ed. Cambridge, MA: MIT Press, 1999.

Selected List of Useful URL's

U. S. Copyright Office - http://lcweb.loc.gov/copyright/

Educational Fair Use Guidelines: A Summary of Concern - http://www.arl.org/info/frn/copy/mmedia.html

The University of Texas Copyright Site - http://www.utsystem.edu/ogc/intellectualproperty/cprtindx.htm

Copyright Clearance Center - http://www.copyright.com/

AcqWeb - http://acqweb.library.vanderbilt.edu/

UCITA Concerns – American Library Association - http://www.ala.org/washoff/ucita/advocacy.html

Electronic Portfolios for Faculty Development

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ABSTRACT

This article examines the conceptual process of creating an electronic professional portfolio. The characteristics of electronic professional portfolios are discussed as well as the benefits of electronic portfolio development. Additional topics include collection and selection of portfolio contents, reflection on portfolio pieces, presentation formats, requisite technology skills, and portfolio applications. The authors themselves developed electronic professional portfolios as part of a faculty technology leadership initiative and used their portfolios as part of their annual evaluation instruments.

Electronic Portfolios for Faculty Development

Introduction

Those of us in education are always looking for ways to better measure our students' knowledge and progress. We read articles and conduct research on assessment. We advise students of the professional knowledge and skills recommended by professional organizations. Increasingly, we encourage or require our students to develop portfolios. Rarely do we think of assessment on a personal level, however, until it is time for our annual evaluation. Then we dust off our vita and hurriedly compile a notebook of articles, conference presentations, student evaluations, and service commendations to get us through another year. There is a better way, and that is development of a professional portfolio. A professional portfolio is "an organized collection of complex, performance-based evidence that indicates one's growth, goals, and current knowledge and skills needed to be competent in a role or area of expertise" (Campbell, Melenyzer, Nettles, & Wyman, 2000, p. 151). As such, a professional portfolio provides a coherent means of documenting successful teaching and accomplishments for tenure, promotions, grantsmanship, publication, consultancies, and other areas of professional activity. It also provides a powerful tool for entering or re-entering the job market. A professional portfolio can provide a dynamic picture of professional growth and change, and it can document mastery and accomplishment of professional knowledge and skills (Campbell, Cignetti, Melenyzer, Nettles, & Wyman, 1997). A professional portfolio presents evidence of expertise and development, and because items are self-selected for inclusion, it is also a unique record of abilities and accomplishments. This aspect of the professional

portfolio makes a powerful statement of who we are as professionals. Not only do we select items to include in our professional portfolio, but also we reflect on those selections. The act of reflection – a critical element of portfolio content – further defines the professional portfolio as our own. Additionally, reflection on why individual items were selected for the portfolio reveals their value to us as we continue to grow professionally (Barrett, 2000b). Finally, professional portfolios allow us to examine "the complexities of professional practice in ways that no other approach can" (Wolf, 1996, p. 34). When we have the opportunity to reflect on our practice, it is likely to improve. Using portfolios not only serves as a documentation tool, but also helps foster "critical skills such as reflection and self-evaluation which are fundamental to excellence in any walk of life" (Danielson & Abrutyn, 1997). Creating and maintaining a professional portfolio, then, helps us grow professionally and serves as a record of that growth.

Electronic Portfolios

Choosing to develop a professional portfolio is the first step. The next is deciding to develop it in electronic format. An electronic portfolio "includes the use of electronic technologies that allow the portfolio developer to collect and organize artifacts in many formats (audio, video, graphics, and text). . . . [It] is not a haphazard collection of artifacts (i.e., a digital scrapbook or multimedia presentation) but rather a reflective tool that demonstrates growth over time" (Barrett, 2000a). The authors made the decision to develop electronic professional portfolios as participants in a faculty technology leadership initiative at our institution. After attending conference workshops on electronic portfolio development and discussions with our dean, we determined that electronic professional portfolio development would be a project that would benefit our colleagues, our students, and ourselves. Many programs in the college currently require students to develop portfolios, and electronic portfolio development is seen as the next logical step. One of the goals of the authors' project was to model electronic professional portfolios for our colleagues and our students in an effort to move closer to electronic portfolio development by students. Therefore, we wanted our portfolios to be professional, and we wanted them to be used for assessment, similar to the professional portfolios that we require of students. Since portfolios should be designed to serve a specific purpose, we decided to use our university's annual evaluation instrument as the framework for our portfolios. This decision was beneficial in several ways. It provided us with a specific framework and an audience for our portfolios. We knew, from university guidelines, what types of documents and artifacts to include in our professional portfolios and how they should be organized. We also knew that our primary audience would be our department chairperson and our dean. We also found that, once they are developed, electronic portfolios are easier to maintain, edit, and update than paper documents. Much of what we create and produce for our teaching, research, and service begins in electronic format – either as word-processed documents or as audio and/or video presentations – and so it is a relatively simple matter to leave them in electronic form rather than convert them to printed documents. In addition, much of what we do as educators cannot be adequately conveyed by the printed word; paper and ink do not convey the vitality and human interactions present in our work. Multimedia provides a flexible structure by which documents and artifacts can be presented in ways that are the most appropriate and effective. Thus, freed from the confines of paper, we were able to create dynamic

electronic professional portfolios that display our work in a variety of formats. Finally, the development of electronic professional portfolios affords us with the opportunity to showcase our technology skills. As technology becomes integral to the practice of teaching, educators will enhance their skills and increasingly integrate them into their practice. Electronic portfolios, which can be geared to varying levels of technology prowess, are an appropriate medium to display those skills.

Portfolio Contents

Selecting the materials to include in the electronic professional portfolio is a two-step process (Barrett, 2000b). The first step of the process is to collect artifacts that might possibly be included in the final product. Ideally, this initial working portfolio should be an ongoing collection of any and all materials that are pertinent to the purpose and framework of the professional portfolio. From this collection, the portfolio developer selects which materials will be included in the professional portfolio. Criteria for selection should reflect the objectives of the portfolio. Generally, only documents and artifacts that display the developer's best work and achievements should be considered for inclusion. These two steps, collection and selection, address the question, "What did I do?" (Van Wagenen & Hibbard, 1998). Selection of materials to include in the professional portfolio is only the beginning, however. A critical element of successful portfolios is reflective responses to each piece in the portfolio. Reflection allows the developer to place the portfolio piece in context; to explain how it relates to specific goals, objectives, or standards; and to articulate what the piece says about the developer's strengths and growth as an educator (Campbell, et al., 2000). Reflection also gives the developer the opportunity to plan ahead and to set specific goals for future growth. In other words, portfolio reflections should answer the questions, "What did I learn?" and "What will I do next?" (Van Wagenen & Hibbard, 1998). Answering these questions are the key to reflection, and the written reflections are what transform a collection of professional work into a professional portfolio. Electronic Portfolio Production

When portfolio materials are selected and reflections composed, it is time to organize them into an electronic presentation. Here again, the portfolio developer is faced with a choice: whether to learn new technology skills or whether to use skills already mastered to produce the electronic portfolio. If the portfolio developer has at least basic technology proficiency, this question is largely a matter of personal choice. Factors that should be considered include personal level of technology skill, objectives of the portfolio, and format of the portfolio contents. Acquiring additional technology skills, especially if technology proficiency is considered a requisite or even a desirable professional attribute, can greatly enhance the effectiveness of the professional portfolio.

Barrett (2000b) identifies levels of teacher skill and levels of electronic portfolio development that provide direction for portfolio developers. Table 1 is an adaptation of her guidelines that can help portfolio developers identify the activities and appropriate software tools that match their level of proficiency.

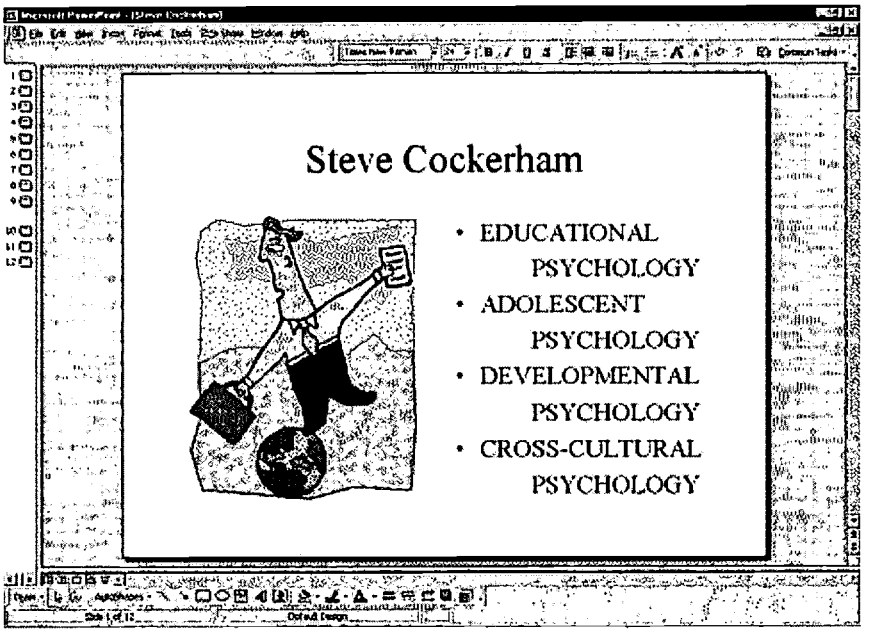
Table 1
Electronic Professional Portfolio Development.

Level of Teacher Skill	Stages of Electronic Portfolio Development
Limited experience with desktop computer – able to use mouse, menus, run simple programs	Use appropriate software tools to collect artifacts and store them on a hard drive, a LAN server, or other storage device, such as a Zip drive. Set up electronic folders for the organizational element to organize the artifacts ***AND***
Proficiency with a word processor, basic email and Internet browsing, enter data into a pre-designed database	Use a word processor, database, hypermedia software or slide show to articulate the organizational element to be demonstrated in the portfolio and to organize the artifacts ***OR***
Able to build a simple hypertext document with hypertext links using a hypermedia program like HyperStudio, Adobe Acrobat Exchange, or an HTML editor	Use a word processor, database, hypermedia software or slide show to articulate the organizational element to be demonstrated in the portfolio and to associate the artifacts using hyperlinks ***OR***
Able to record sounds, scan images, design an original database	Use an HTML editor to articulate the organizational element to be demonstrated in the portfolio and to organize the artifacts. ***OR***
Multimedia programming or HTML authoring, create QuickTime movies, program a relational database	Use a multimedia authoring program to organize by the organizational element to be demonstrated in the portfolio

It should be noted that several widely available software applications, such as Microsoft PowerPoint, Microsoft FrontPage, Microsoft Publisher, Netscape Composer, and Knowledge Adventure's HyperStudio, provide sufficient flexibility and sophistication to meet the needs of a wide variety of portfolio developers. Familiarity, availability, portfolio objectives and content, technology expertise, and presentation options are the primary criteria that guide selection of these or other software programs. The authors selected two software programs to publish their portfolios: Steve used Microsoft PowerPoint and Marilyn used Microsoft FrontPage. Choices were based primarily on levels of expertise, portfolio objectives and content, and presentation options. Steve decided to integrate his electronic professional portfolio with the traditional paper evaluation format. He selected PowerPoint to enhance his knowledge of that software and to create a simple electronic portfolio that functions as a table of contents to his paper

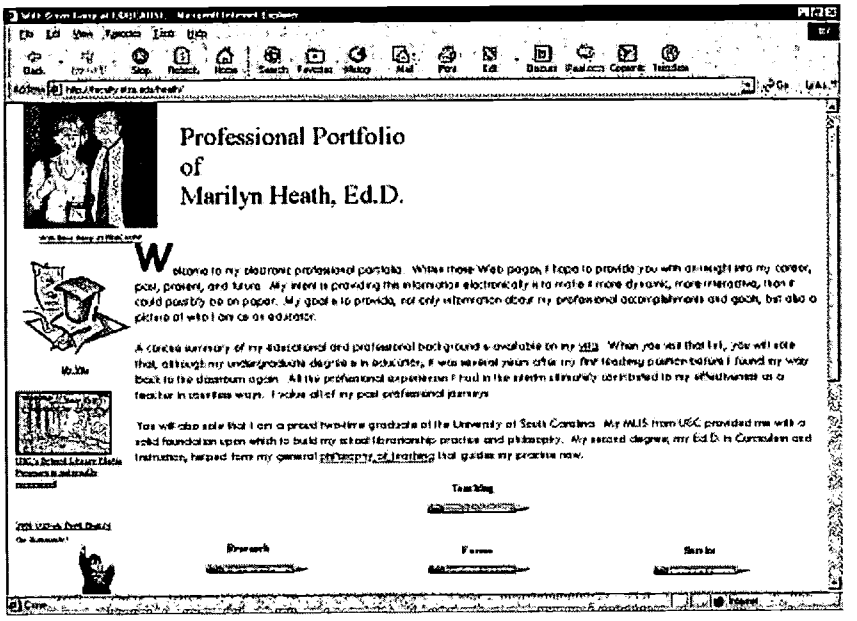
portfolio (Figure 1). His electronic portfolio has the benefits of being easy to create, maintain, and edit, and of being easily transmitted, either electronically or on a storage device such as a floppy or CD-R/W.

Figure 1. Steve's PowerPoint Portfolio.



Additionally, Steve's electronic portfolio is accessible only by himself and those he sends it to, an additional benefit for a portfolio used as an assessment tool. Marilyn chose Microsoft FrontPage for her electronic professional portfolio because she wanted to learn how to better use the software and because she wanted to publish her portfolio as a Web page (Figure2). Unlike Steve's approach, Marilyn's entire portfolio is included on the Web. The only exception is the mandatory evaluation forms which are on the site but are left blank for privacy reasons. Marilyn's portfolio has the benefit of accessibility; it is available to anyone who knows the URL. Administrators, colleagues, and students all have access to her professional portfolio. In addition, it makes ample use of hyperlinks and graphics to illustrate and enrich the content for each organizational element. Both professional portfolios were well received by administrators during the formal evaluation process, and because they are works in progress, they will be edited and updated during the current year.

Figure 2. Marilyn's FrontPage Portfolio.



Electronic Professional Portfolio Applications

In the final analysis, electronic professional portfolios serve many of the same functions as their paper counterparts. They can serve as evaluation instruments, credentialing tools, and resumes. They can enhance the prospects for advancement, tenure, or employment. All of these functions are important. But perhaps the most important function of an electronic professional portfolio is that it provides an authentic, dynamic portrayal of who we are as educators. It allows us to freely share our accomplishments with others as we showcase our technology skills. It enhances our image as innovators and professionals. In addition, it "enables us to do exactly what we ask our students to do: self-assess, self-evaluate, and self-regulate" (Van Wagenen & Hibbard, 1998, p. 29). Electronic professional portfolios allow us to examine and reflect upon our unique experiences as educators and ultimately, to grow beyond them.

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